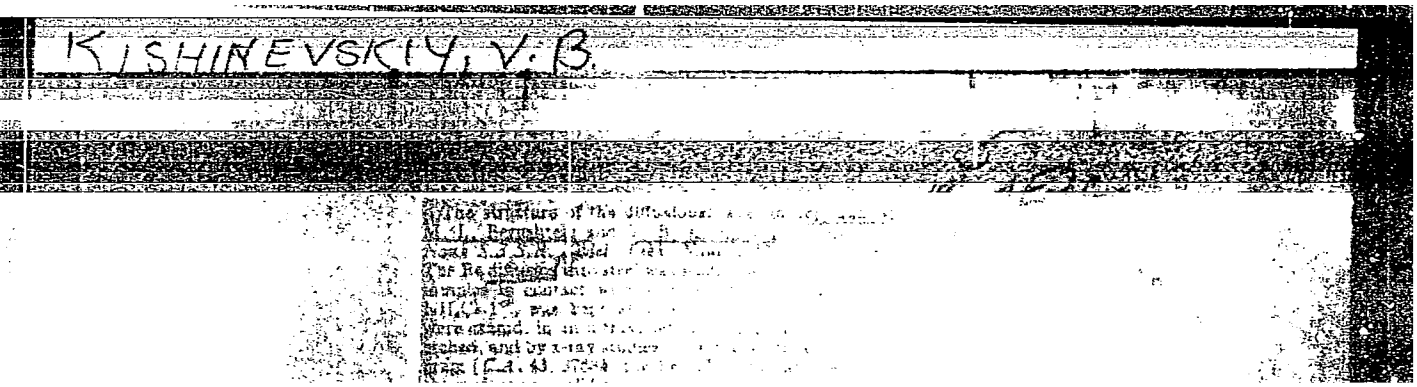
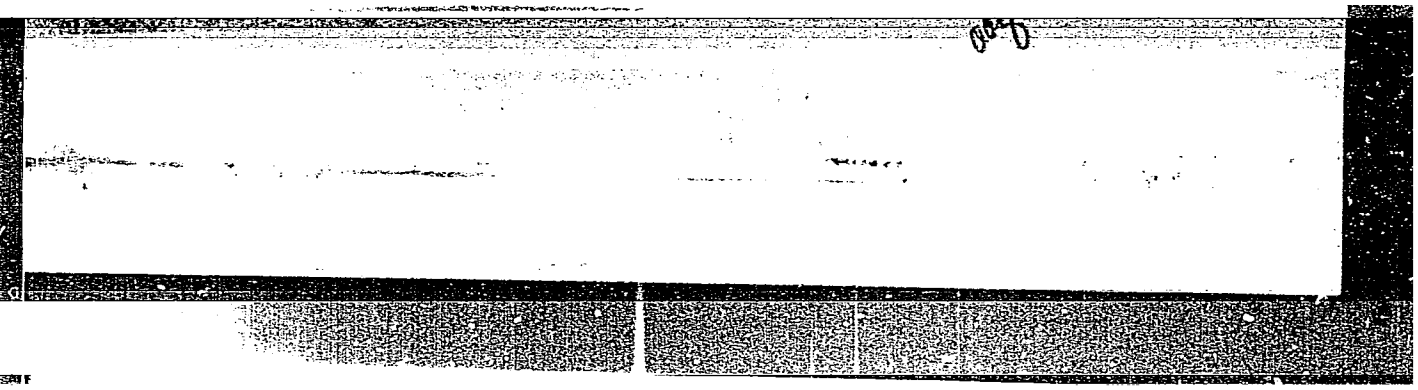
KISHINEVSKIY, V.B.(Moskva); GRIGOROVICH, V.K.(Moskva)

Heat-resistance of ziroconium-niobium alloys. Izv. AN SSSR.Otd.tekh. nauk. Met. i topl. no.5:135-138 S-O '62. (MIRA 15:10)
(Zirconium-niobium alloys--Thermal properties)





BERNSHTEYN, M.L.; KISHINEVSKIY, V.B.

Apparatus for ultraviolet microscopy; review of foreign literature.
Zab.lab.21 no.10:1256-1259 '55. (MLRA 9:1)

1.Obzor zarubezhnykh dannykh.
(Microscope)

KISHINEVSKIY, R.N.

Using a chemical composition for impregnating switch chambers. Elek.i tepl.tiaga 3 no.6:16 Je '59. (MIRA 12:9)

1. Nachal'nik remontno-revizionnogo tsekha uchastka energosnabzheniya, Kalininskaya doroga.
(Electric railroads—Substations)
(Electric switchgear)

KISHINEVSKIY, R.M., inzh.

Assembly line building of steel floating docks. Sudostroenie 28 no.7:62-65 Jl '62. (MIRA 15:8)
(Docks) (Assembly line methods)

NALETOV, N.; POGODIN, M.; GRIBANOVA, N.; KISHINEVSKIY, P.

We need help. Sov. profsoiuzy 16 no.22:43 N '60. (MIRA 14:1)

1. Zamestitel' predsedatelya Doma kul'tury, g.Bryansk (for Kishinevskiy).

(Bryansk—Amateur theatricals)

KISHINSKIY, M. I.

Handbook for skilled workers on round log transportation roads. Moskva, Goslestekhizdat, 1944. 31 p.

KISHINSKIY, M. I.

36375 KISHINSKIY, M. I. I VOL'F, V. I.
Pogruzhatel' pritsepa na avtomobil': (Pogruzhatel' MTP-3) Izv. Prom-St', 1949, No. 11, S. 16-18

SO: Letopis' Zhurnal'nykh Statey, No. 49, 1949

KISHINSKIY, M. I.

Technology

Use and technical maintenance of the automobile ZIS-150 in the hauling of timber, Moskva, Goslesbumizdat, 1951.

Monthly List of Russian Accessions, Library of Congress, December 1952. UNCLASSIFIED.

STRASHINSKIY, B.A.; KISHINSKIY, M.I., redaktor; SHMEL'KINA, S.I., tekhnicheskiy redaktor

[Organizing the construction of logging roads] Organizatsiia stroitel'stva lesovoznykh dorog. Moskva, Goslesbumizdat, 1952. 113 p. (Biblioteka lesozagotovitelia, no.42) [Microfilm]
(Forest roads) (MLRA 10:1)

1. BUVERT, V. V., Prof.; IONOV, B. D., Docent; KISHINSKIY, M. I., Docent; SYROMYATNIKOV, S. A., Docent

2. USSR (600)

4. Lumbering

7. New textbook on land transport of timber ("Land transport of timber." Prof. V. V. Buvert, Docent B. D. Ionov, Docent M. I. Kishinskiy, Docent S. A. Syromyatnikov. Reviewed by M. A. Zav'yalov, G. T. Urtaev.) Les. prom., 13, no. 4, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

KISHINSKIY, M.I.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Buvert, V.V. Ionov, B.D. Kishinskiy, M.I.	"Land Transport of Lumber" (textbook)	Moscow Forestry Engineering Institute

SO: W-30604, 7 July 1954

KISHINSKIY, Mikhail Il'ich; BUVERT, V.V., redaktor; KARASIK, N.P., tekhnicheskiy redaktor.

[Using and repairing logging roads] Ekspluatatsiia i remont lesovoznykh dorog. Moskva, Goslesbumizdat. Vol.1 [Dirt, gravel, log and snow-and ice roads] Gruntovye, graviinye, lezhnevye i snezhnoledianye dorogi. 1954. 326 p. (MLRA 8:8)
(Roads)

KISHINSKIY M.I.

AUTHOR: None Given SOV-118-58-7-7/20

TITLE: A Scientific-Technical Conference on Questions Regarding the Mechanization of the Lumber Industry (Nauchno-tekhnicheskaya konferentsiya po voprosam mekhanizatsii v lesnoy promyshlennosti)

PERIODICAL: Mekhanizatsiya trudoyëmkikh i tyazhëlykh rabot, 1958, Nr 7, p 19, (USSR)

ABSTRACT: In May 1958, the Moskovskiy lesotekhnicheskiy institut (the Moscow Institute of Forest Engineering) called a scientific conference. Attending were approximately 300 persons, among them representatives from the Gor'kovskiy (Gor'kiy), Kalininskiy (Kalinin), Kirovskiy (Kirov), Komi, Permskiy (Perm'), Tyumenskiy (Tyumen') and Moskovskiy (Moscow) sovnarkhozes. Also attending were delegates from big lumber enterprises, lumber mills, furniture factories; the Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR (State Scientific Technical Committee of the USSR Council of Ministers), the USSR Gosplan, the TsNIIME, the TsNIIMOD, the Giprolesprom and from other organizations. The Member-Correspondent of the VASKhNIL, N.P. Anuchin reported on the future development of the Soviet lumber industry (1959 to 1965). The Chief Engineer of the Krestetskiy-lespromkhoz TsNIIME (the Kresttsy Lespromkhoz) reported on a semi-automatic conveyer line introduced at

Card 1/ 3

A Scientific-Technical Conference on Questions Regarding the Mechanization of the Lumber Industry

the Kresttsy lespromkhoz. The Candidate of Technical Sciences, B.A. Tauber delivered a report on the mechanization of lumber loading and stacking operations. The following reports were also heard: Dotsent N.I. Suboch - "The Present State and Development Methods of Traction Machinery in Lumber Transportation"; Dotsent M.I. Saltykov - "The All-Round Utilization of Raw Material and the Organization of Lumber Industry on the Principle of Continuous Forest Use"; Candidate of Technical Sciences, G.A. Vil'ke - "The Vibration of Gasoline Motor Saws";scientific worker, V.V. Kharitonov - "Choosing a Method of Bark Stripping"; Dotsent M.I. Kishinskiy - "The Transportation of Lumber by Motor Transport in Winter"; Professor M.I. Zaychik - "The Exploitation of Diesel Engines at Shops"; Professor N.N. Chulitskiy - "Investigations on New Technological Equipment for Production Line and Automated Furniture Production"; Head of the Tekhnologicheskiy otdel proyektnogo instituta Nr 2 (Technological Division of the Nr 2 Design Institute), V.A.

SOV-118-58-7-7/27

A Scientific-Technical Conference on Questions Regarding the Mechanization of the Lumber Industry

Tselebrovskiy - "Mechanization and Automation of Production Processes at the Raw Material Exchange Center of the Omutninsk House Construction Combine".

1. Lumber industry--USSR

Card 3/3

SEROV, Aleksandr Vladimirovich, dotsent; SANYUKEVICH, Nikolay Andreyevich, starshiy prepodavatel'; BYTSKO, Vladimir Aleksandrovich, assistent; VOLGIN, Vitaliy Pavlovich, assistent; NIKIFOROV, Vasiliy Maksimovich, kand.tekhn.nauk; VOZNESENSKIY, N.P., prof., doktor tekhn. nauk, retsenzent; KISHINSKIY, M.I., red.; PITERMAN, Ye.L., red. izd-va; KARASIK, N.P., tekhn.red.

[Use of machinery in logging camps] Ekspluatatsiia mashin v lesozagotovitel'nykh predpriiatiiakh. Moskva, Goslesbumizdat, 1959. 280 p. (MIRA 13:3)

1. Kafedra "Tyagovyye mashiny" Moskovskogo lesotekhnicheskogo instituta (for Serov, Sanyukevich, Bytsko, Volgin, Nikiforov).
(Logging--Machinery)

25(1), 28(1), 32(2) SOV/118-59-9-9/20

AUTHORS: Radkovskiy N.A., Engineer, and Ivanov M.I. and Kishinskiy M.I., Candidates of Technical Sciences

TITLE: Mechanization of Snow-Ice Road Building

PERIODICAL: Mekhanizatsiya i avtomatizatsiya proizvodstva, 1959, Nr. 9, pp 37-41 (USSR)

ABSTRACT: Most of the timber cutting regions are notable for their snowy winters when snow lies over 5-6 months in a year, 50-60 cm high. On the other hand, the vast boggy areas often encountered in these regions hinder and sometimes make it altogether impossible to transport timber during the summer time. Under these circumstances, the advantages of winter transport become evident; hence the importance of winter road building mechanization. All the outfits for snow-road building applied in the Soviet Union until now (wooden rollers, squares, track cleaners, etc.) were primitive, hand-made devices which did not ensure an adequate functioning of winter roads and required much manual labor for their maintenance. Finally two designs ensuring a high efficiency

Mechanization of Snow-Ice Road Building

degree and diminishing the volume of labor required for the building and maintenance of winter roads have been worked out and put into operation. One of these devices is an automotive vacuum sprinkler, designed by V.G. Shtarker, another is an assembly for maintaining the road in proper condition, designed by E.Ya.Vitkovskiy. The vacuum sprinkler is a heated, 4 m^3 capacity tank mounted on the automobile ZIL-150 (Fig. 1). At switching to "vacuum", the automobile motor begins to suck the air from the tank, and water from a reservoir enters through a hose into the tank. When the tank is filled, an electric switch connected with a floating device, automatically switches the motor back to "atmosphere" and stops the water entering the tank. The water inlet and outlet attachments, as well as the hose, are heated by exhaust gases; even during the strongest frosts they never freeze and operate faultlessly. The inside of the tank is also heated; as a result, the water temperature never drops below 10° - 14° C. To let the water out, the dri-

ver opens the water outlet by means of a special lever placed in his cabin. Water comes out on a tray and is distributed along the entire width of the stretch which must be covered with ice. The water lifting height is 3 to 5 m, which is sufficient for taking it from natural sources. At the Bortomskaya single-track ice road in the Komi ASSR, efficiency of such a sprinkler was 64 m^3 a day. The assembly for road maintenance is shown in Fig. 2. It comprises, on the whole, a scraper, a wire brush and a fan which consecutively clean the track. Simultaneously with the cleaning, the assembly does road levelling by removing the surplus snow from the track. Application of such an assembly in the Arkhangel'skaya oblast' has permitted keeping a road in good condition without using any trackmen, while formerly it was required to keep a worker for every 1-2 km of the road. To decrease labor expenditure and the cost of building and maintenance of winter roads, they are built by means of snow compacting; particularly it applies to such roads where the traffic is limited. In order to intensify the process of compacting, a special assembly was designed (Fig. 3). It consists of three units: a device in the

Mechanization of Snow-Ice Road Building

form of a quickly rotating cutter for loosening the snow, an attachment for heating the snow, and a vibration compacting outfit. The cutter is round in shape, 80 cm in diameter; its peripherial rotation speed varies from 15 to 25 m/sec. The heat energy is introduced into the snow, by burning a liquid oil through the nozzles placed in the upper part of the heat chamber. The compacting device consists of a plate 70 cm long; lifting angle of its front part is 15°-20°; kinetic moment of vibrator debalance varies from 2 to 25 kg/cm; vibration frequency is 4000 oscillations a minute. The assembly is mounted on runners and can be trailed by tractor DT-55 or S-80. 1.5 to 2 km of track 2.2 m wide can be compacted within an hour. There are 3 tables and3 diagrams.

Card 4/4

BUVERT, Viktor Vladimirovich, prof.; IONOV, Boris Dmitriyevich, dotsent, kand.tekhn.nauk; KISHINSKIY, Mikhail Il'ich, dotsent, kand.tekhn. nauk; SYROMYATNIKOV, Sergey Arkad'yevich, dotsent, kand.tekhn. nauk; KORUNOV, M.M., prof., retsenzent; VERIGO, M.F., prof., doktor tekhn.nauk, red.; POLTEVA, B.Kh., red.izd-va; BACHURIHA, A.M., tekhn.red.

[Land transportation of timber] Sukhoputnyi transport lesa. Izd.2., perer. Pod obshchei red. M.F.Verigo. Moskva, Goslesbumizdat. Vol.1. 1960. 475 p. (MIRA 14:4)
(Lumber--Transportation)

DARAGAN, Leonid Dmitriyevich; LAKHNO, Rostislav Pavlovich; KISHINSKIY, M.I., kand. tekhn. nauk, red.; TIKHONOVA, N.V., red. izd-va; KORNYUSHINA, A.S., tekhn. red.

[Handbook for the lumber truck road expert] Spravochnik mastera lesovoznoi avtomobil'noi dorogi. Pod red. M.I.Kishinskggo. Moskva, Goslesbumizdat, 1961. 153 p. (MIRA 14:5)
(Forest roads)

VORONITSYN, K.I., kand. tekhn. nauk, red.; TIZENGAUZEN, P.E., kand. tekhn. nauk, red.; NADBAKH, M.P., red.; TANTSEV, A.A., starshiy nauchnyy sotr., red.; ABRAMOV, S.A., kand. tekhn. nauk, red.; ABRAMOV, D.A., red.; BOGDANOV, N.I., starshiy nauchnyy sotr., red.; VINOGOROV, G.K., kand. tekhn. nauk, red.; GAVRILOV, I.I., starshiy nauchnyy sotr., red.; GUSARCHUK, D.M., starshiy nauchnyy sotr., red.; D'YAKONOV, A.I., red.; ZAV'YALOV, M.A., kand. tekhn. nauk, red.; ZARETSKIY, M.S., starshiy nauchnyy sotr., red.; KACHELKIN, L.I., starshiy nauchnyy sotr., red.; KISHINSKIY, M.I., kand. tekhn. nauk, red.; KOLTUNOV, B.Ya., starshiy nauchnyy sotr., red.; OSIPOV, A.I., kand. tekhn. nauk, red.; SHINEV, I.S., kand. ekon. nauk, red.

[Materials of the enlarged session of the Scientific Council of the Central Scientific Research Institute for Mechanization and Power Engineering in Lumbering on problems concerning power engineering and the electrification of the lumber industry] Materialy rasshirennoi sessii Uchenogo soveta TsNIIME po voprosu energetiki i elektrifikatsii lesnoi promyshlennosti. Moskva, 1961. 75 p. (MIRA 15:4)

(Continued on next card)

VORONITSYN, K.I.---(continued) Card 2.

1.Khimki.TSentral'nyy nauchno-issledovatel'skiy institut mekhanizatsii i energetiki lesnoy promyshlennosti. 2. Nachal'nik TSentral'nogo byuro tekhnicheskoy informatsii lesnoy promyshlennosti (for Nadbakh). 3. Direktor TSentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Voronitsyn). 4. Uchenyy sovet TSentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for D'yakonov). 5. Nachal'nik otdeleniya energetiki i sredstv avtomatizatsii TSentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Zaretskiy).

(Lumbering) (Electric power)

MEL'NIKOV, Valentin Ivanovich, dots., kand. tekhn. nauk; SERGEYEV, Petr Georgiyevich, dots., kand. tekhn. nauk; DMITRIYEV, Yuriy Yakovlevich, kand. tekhn. nauk; SELIN, M.F., retsenzent; DOIL'NITSINA, A.G., retsenzent; IONOV, B.D., retsenzent; KISHINSKIY, M.I., otv. red.; PLESKO, Ye.P., red. izdva; GRECHISHCHEVA, V.I., tekhn. red.

[Land transportation of timber and lumber floating]Sukhoputnyi lesotransport i lesosplav. Moskva, Goslesbumizdat, 1962. 314 p. (MIRA 15:12)

1. Petrozavodskiy lesotekhnicheskiy tekhnikum (for Ionov).
(Lumber—Transportation)

KISHINSKIY, Mikhail Il'ich, kand. tekhn. nauk, dots.; YEPIFANOV, Boris Yefimovich, kand. tekhn. nauk, dots.; SMIRENNIKOV, Pavel Stepanovich, inzh.; STRASHINSKIY, B.A., inzh., retsenzent; NOVIKOV, G.G., prepodavatel', retsenzent; GAVRILOV, I.I., red.

[Use and repair of logging roads] Ekspluatatsiia i remont lesovoznykh dorog. Izd.2., perer. Moskva, Izd-vo "Lesnaia promyshlennost'," 1964. 40. p. (MIRA 17:7)

1. Alatyrskiy lesotekhnicheskiy tekhnikum (for Novikov).

KISHINSKIY, S. A.

KISHINSKIY, S. A.

Moskva, Goslesbumizdat, 1951.
818 p. illus., diagrs., tables.
"Literatura" at endoof chapters.

N/5
729.4
.B9

KISHINSKIY, V.V.

Basic measures securing the completion of the plan of topographic and geodetic work in 1961. Geod. i kart. no.1:3-8 Ja '61.
(MIRA 14:9)

(Surveying)

Kishisheva, A. A.

USSR/Human and Animal Psysiology - Blood Circulation. V-5

Abs Jour : Ref Zhur - Biol., No 1, 1958, 3984

Author : A.A. Kishisheva
Inst :
Title : Pulmonary Hypertension in Cases of Non-Closure of the Arterial Duct.

Orig Pub : Khirurgiya, 1957, No 4, 21-31

Abstract : No abstract.

Card 1/1

PAVEL, I.; KYMPYANU , S.; KISHIU, N.

Electrophoretic examination of blood serum proteins in experimental deficiency of vitamins A, B, C and D, and biotin. Vop.pit. 20 no.2:47-50 Mr-Ap '61. (MIRA 14:6)

1. Iz kliniki pitaniya i diyetetiki pri bol'nitse imeni doktora Kantakuzena, Bukharest, Rumyniya.
(DEFICIENCY DISEASES) (BLOOD PROTEINS)

KISHKAR', P.M., veterinarnyy vrach.

Book with considerable shortcomings ("Compound method of controlling parasitic diseases in domestic animals." R.S.Chebotarev). Reviewed by P.M.Kishkar'. Veterinariia 32 no.7:90-91 Jl '55. (MLRA 8:9)
(CHEBOTAREV, R.S.) (PARASITES--DOMESTIC ANIMALS)

NOVOSELOV, S.S.; VARTANYAN, A.M.; KISHKAREV, V.A.; AVERCHENKOV, D.O.; SIDOROVSKIY, V.A.

Pilot plant testing methods of removing copper from crude lead with transfer of the copper into matte. TSvet. met. 35 no.5: 25-31 My '62. (MIRA 16:5)
(Lead--Metallurgy) (Copper--Metallurgy)

KISHKIN, B. P.

KISHKIN, B. P.: "The concentration of stress in plane deformation, and breakdown when grinding with deep cuts." Moscow State U imeni M. V. Lomonosov. Moscow, 1956.
(Dissertation for the Degree of Candidate in Physicomathematical in Sciences).

SO: Knishaya Letopis', No 23, 1956

KISHKIN, B.P.

Concentration of stresses during plane deformation and destruction of a beam with deep notches. Vest. Mosk. un. Ser. mat.mekh. astron., fiz., khim. 12 no. 6:17-23 '57. (MIRA 11:10)

1. Kafedra teorii uprugosti Moskovskogo gosudarstvennogo universiteta.
(Girders--Testing)

S/055/63/000/001/005/008
D251/D308

AUTHORS: Kishkin, B. P. and Noskova, I. G.

TITLE: On the strength of glass-cloth laminate after heat-treatment

PERIODICAL: Moscow. Universitet. Vestnik. Seriya I. Matematika, Mekhanika, no. 1, 1963, 46-47

TEXT: A sheet of glass-cloth laminate КАСТ-В (KAST-V) was tested, using specimens of size 200 x 30 x 6 mm. The specimens were heated to the required temperature (controlled automatically with precision ± 2°C), and allowed to cool for 24 hours. The temperatures attained varied from 85° to 180°C. Results showed that the thermal working increased the values of the breaking load and the strength limit and that these new values did not change in the course of three months. The optimum values were obtained with heating to 140°C. There are 1 figure and 1 table.

Card 1/2

On the strength of ... S/055/63/000/001/005/008
D251/D308

ASSOCIATION: Kafedra teorii uprogosti (Department of the Theory of Elasticity)

SUBMITTED: January 6, 1962

Card 2/2

KISHKIN, D.

Endemic goiter in the village Samoranovo, Stanke-Dimitrov region. Suvrem.med.,Sofia no.6:30-38 '59.

1. Iz Obedinenata gradska bolnitsa - gr. Stanke Dimitrov. Gl.lekar: B. Isakov.

(GOITER statist.)

KISHKIN, D.

Effect of age and sex factors on the development of endemic goiter. Suvrem med., Sofia no.4/5:121-132 '61.

1. Iz Gradskata bolnitsa v gr. St. Dimitrov (Glaven lekar B. Isakov.)

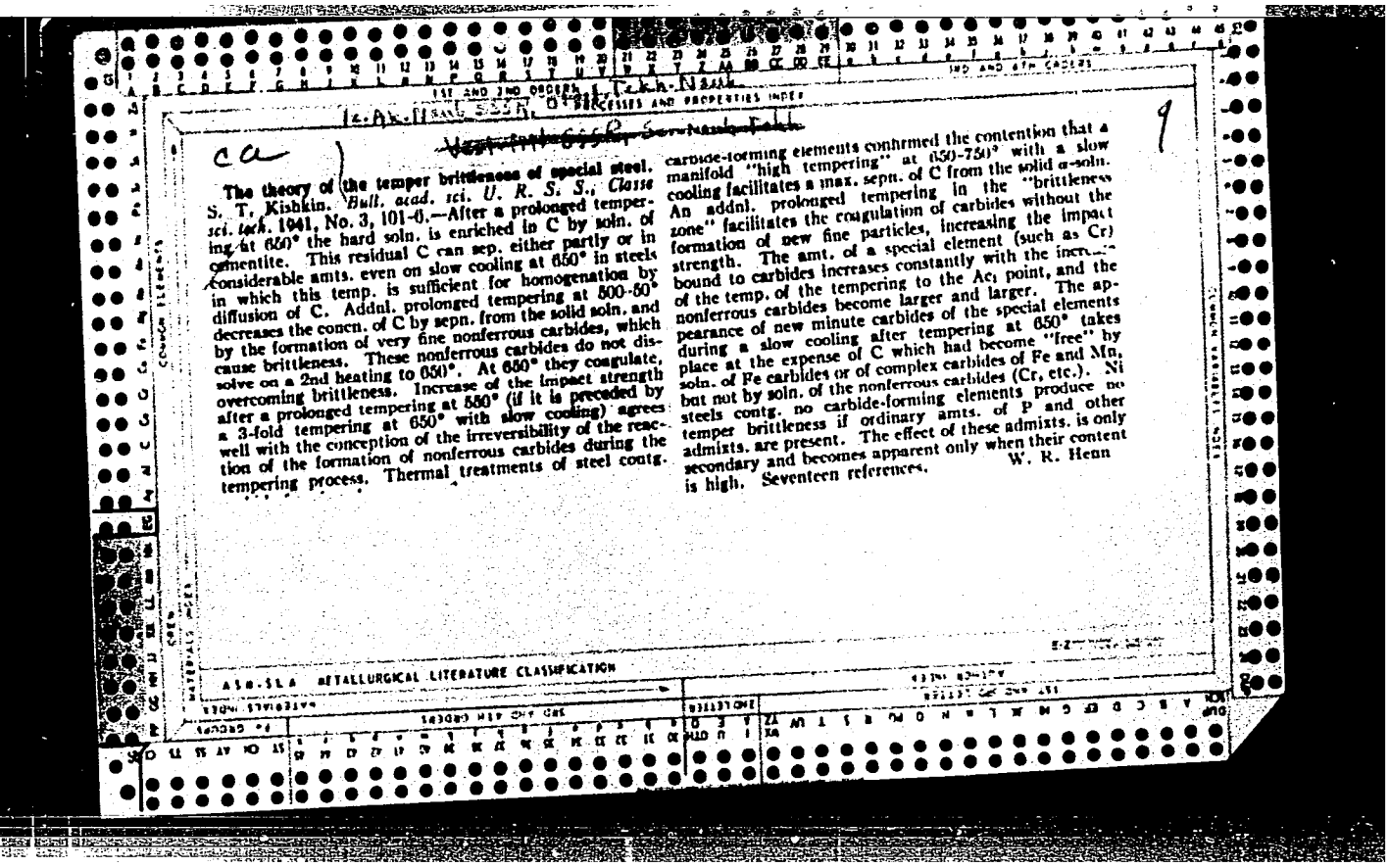
(GOITER statist) (AGING) (SEX)

KISHKIN, D.

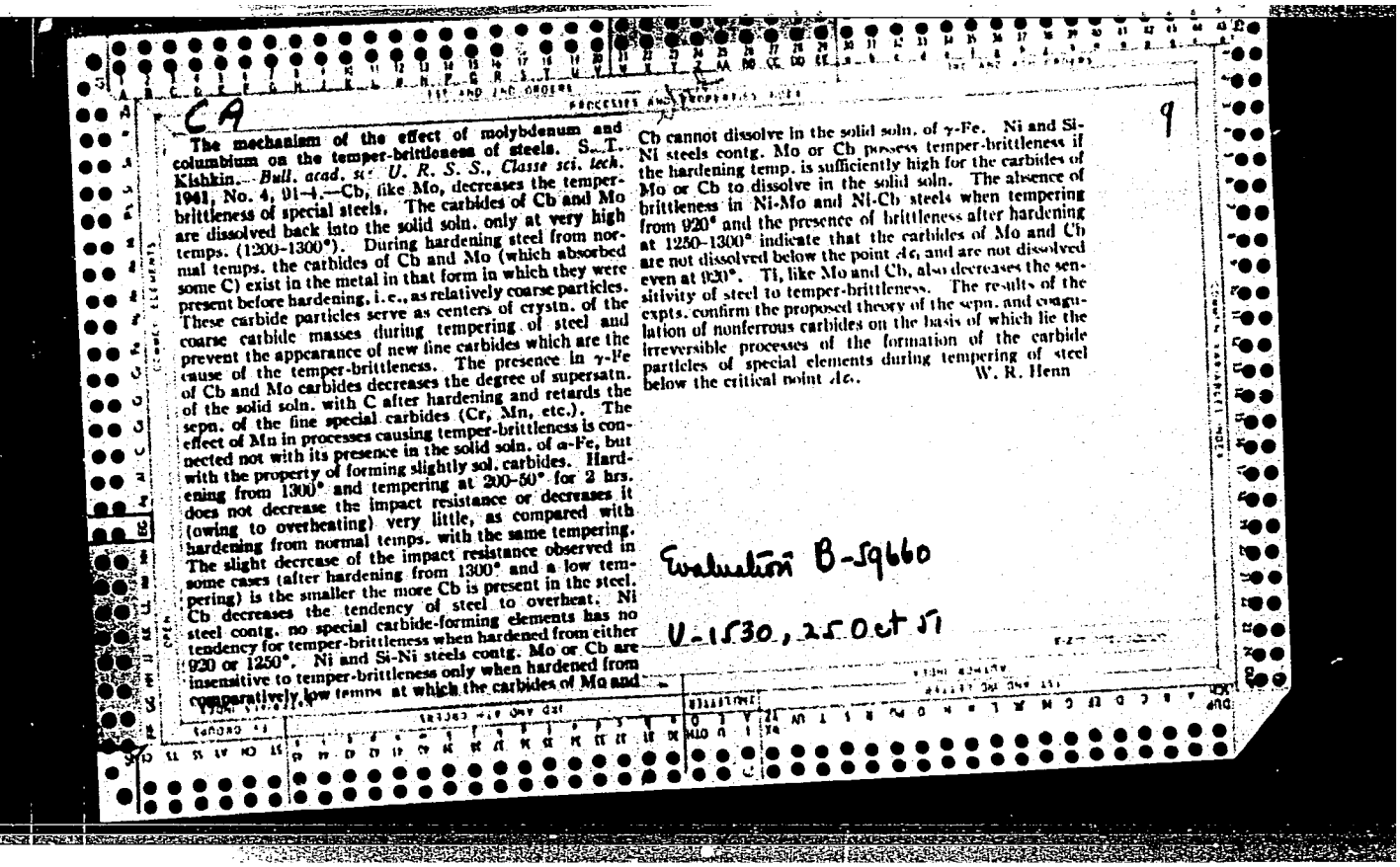
Results of supplementing iodine therapy with a Bulgarian preparation Antistrumin in students. Suvrem med., Sofia no.4/5:133-137 '61.

1. Iz Gradskata bolnitsa v St. Dimitrovo (Glav. lekar B. Isakov.)

(GOITER prev & control) (IODINE ther)



The theory of the temper brittleness of special steel. S. T. Kishkin. *Bull. acad. sci. U. R. S. S., Classe sci. tech.* 1941, No. 3, 101-6.—After a prolonged tempering at 650° the hard soln. is enriched in C by soln. of cementite. This residual C can sep. either partly or in considerable amts. even on slow cooling at 650° in steels in which this temp. is sufficient for homogenation by diffusion of C. Addnl. prolonged tempering at 500-50° decreases the concn. of C by sepn. from the solid soln. and by the formation of very fine nonferrous carbides, which cause brittleness. These nonferrous carbides do not dissolve on a 2nd heating to 650°. At 650° they coagulate, overcoming brittleness. Increase of the impact strength after a prolonged tempering at 580° (if it is preceded by a 3-fold tempering at 650° with slow cooling) agrees well with the conception of the irreversibility of the reaction of the formation of nonferrous carbides during the tempering process. Thermal treatments of steel contg. carbide-forming elements confirmed the contention that a manifold "high tempering" at 650-750° with a slow cooling facilitates a max. sepn. of C from the solid α-soln. An addnl. prolonged tempering in the "brittleness zone" facilitates the coagulation of carbides without the formation of new fine particles, increasing the impact strength. The amt. of a special element (such as Cr) bound to carbides increases constantly with the increase of the temp. of the tempering to the Ac_1 point, and the nonferrous carbides become larger and larger. The appearance of new minute carbides of the special elements during a slow cooling after tempering at 650° takes place at the expense of C which had become "free" by soln. of Fe carbides or of complex carbides of Fe and Mn, but not by soln. of the nonferrous carbides (Cr, etc.). Ni steels contg. no carbide-forming elements produce no temper brittleness if ordinary amts. of P and other admixts. are present. The effect of these admixts. is only secondary and becomes apparent only when their content is high. Seventeen references. W. R. Henn



CA

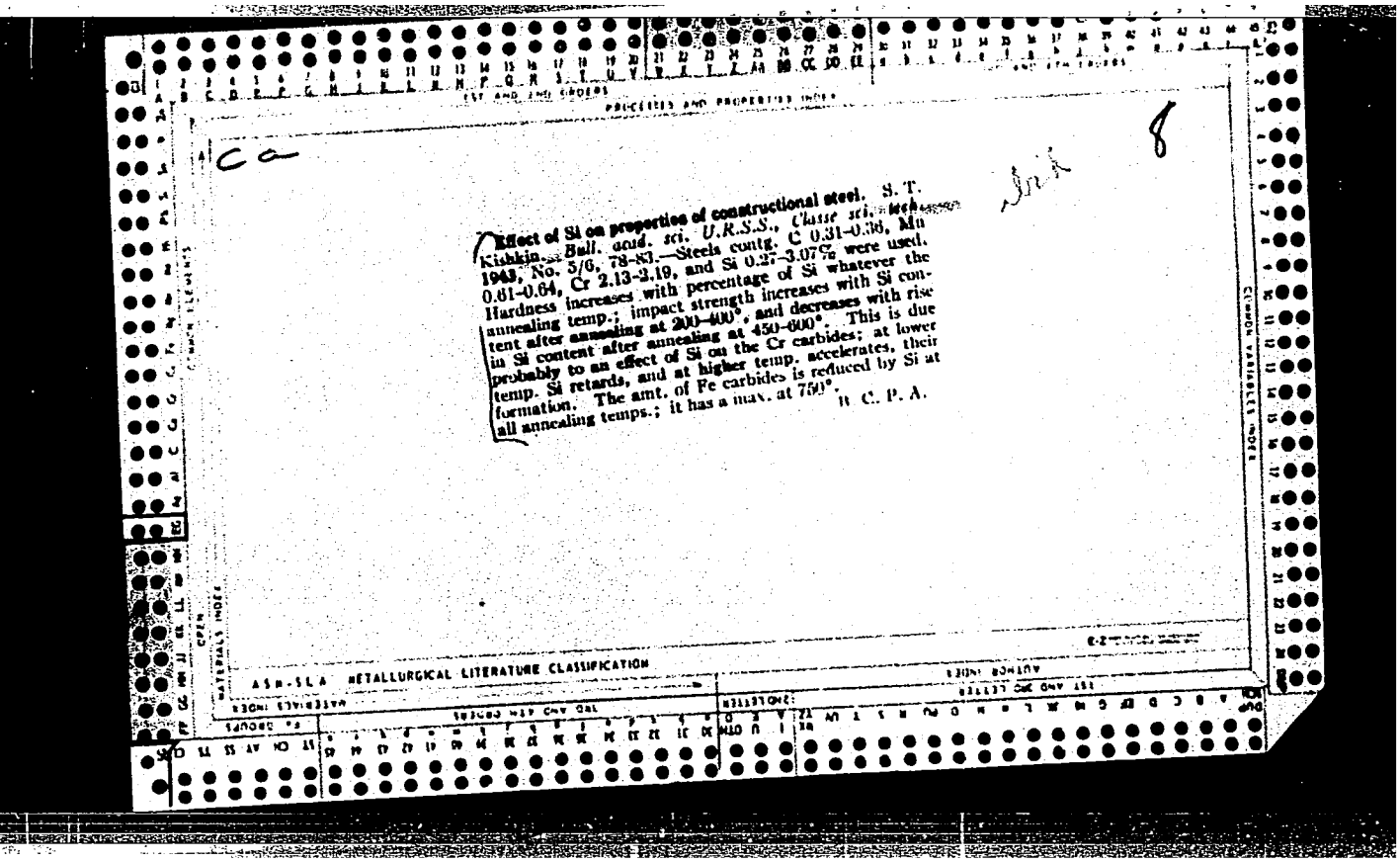
9

The mechanism of the effect of molybdenum and columbium on the temper-brittleness of steels. S. T. Kishkin.—*Bull. acad. sci. U. R. S. S., Classe sci. tech.* 1941, No. 4, 91–4.—Cb, like Mo, decreases the temper-brittleness of special steels. The carbides of Cb and Mo are dissolved back into the solid soln. only at very high temps. (1200–1300°). During hardening steel from normal temps. the carbides of Cb and Mo (which absorbed some C) exist in the metal in that form in which they were present before hardening, i. e., as relatively coarse particles. These carbide particles serve as centers of crystn. of the coarse carbide masses during tempering of steel and prevent the appearance of new fine carbides which are the cause of the temper-brittleness. The presence in γ-Fe of Cb and Mo carbides decreases the degree of supersatn. of the solid soln. with C after hardening and retards the sepn. of the fine special carbides (Cr, Mn, etc.). The effect of Mn in processes causing temper-brittleness is connected not with its presence in the solid soln. of α-Fe, but with the property of forming slightly sol. carbides. Hardening from 1300° and tempering at 200–50° for 2 hrs. does not decrease the impact resistance or decreases it (owing to overheating) very little, as compared with hardening from normal temps. with the same tempering. The slight decrease of the impact resistance observed in some cases (after hardening from 1300° and a low tempering) is the smaller the more Cb is present in the steel. Cb decreases the tendency of steel to overheat. Ni steel contg. no special carbide-forming elements has no tendency for temper-brittleness when hardened from either 920 or 1250°. Ni and Si-Ni steels contg. Mo or Cb are insensitive to temper-brittleness only when hardened from comparatively low temps at which the carbides of Mo and Cb cannot dissolve in the solid soln. of γ-Fe. Ni and Si-Ni steels contg. Mo or Cb possess temper-brittleness if the hardening temp. is sufficiently high for the carbides of Mo or Cb to dissolve in the solid soln. The absence of brittleness in Ni-Mo and Ni-Cb steels when tempering from 920° and the presence of brittleness after hardening at 1250–1300° indicate that the carbides of Mo and Cb are not dissolved below the point A_{C_1} and are not dissolved even at 920°. Ti, like Mo and Cb, also decreases the sensitivity of steel to temper-brittleness. The results of the expts. confirm the proposed theory of the sepn. and coagulation of nonferrous carbides on the basis of which lie the irreversible processes of the formation of the carbide particles of special elements during tempering of steel below the critical point A_{C_1}.

W. R. Henn

Evaluation B-59660

U-1530, 25 Oct 51



Ca

8

Effect of Si on properties of constructional steel. S. T. Kishkin. *Bull. acad. sci. U.R.S.S., Classe sci. techn.*, 1943, No. 5/6, 78–83.—Steels contg. C 0.31–0.36, Mn 0.61–0.64, Cr 2.13–2.19, and Si 0.27–3.07% were used. Hardness increases with percentage of Si whatever the annealing temp.; impact strength increases with Si content after annealing at 200–400°, and decreases with rise in Si content after annealing at 450–600°. This is due probably to an effect of Si on the Cr carbides; at lower temp. Si retards, and at higher temp. accelerates, their formation. The amt. of Fe carbides is reduced by Si at all annealing temps.; it has a max. at 750°. H. C. P. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KISHKIN, S. T.

PA 14T43

USSR/Steel - Hardness
Martensite

Dec 1946

"The Nature of the Hardening of Steel and High Hardness of Martensite," S. T. Kishkin, 10 pp

"Izv Ak Nauk Otd Tekh" No 12, 1799

Discusses various methods of hardening steel. Concludes that the high hardness of martensite may solve the problem of strengthening steel to overcome cold distortion.

14T43

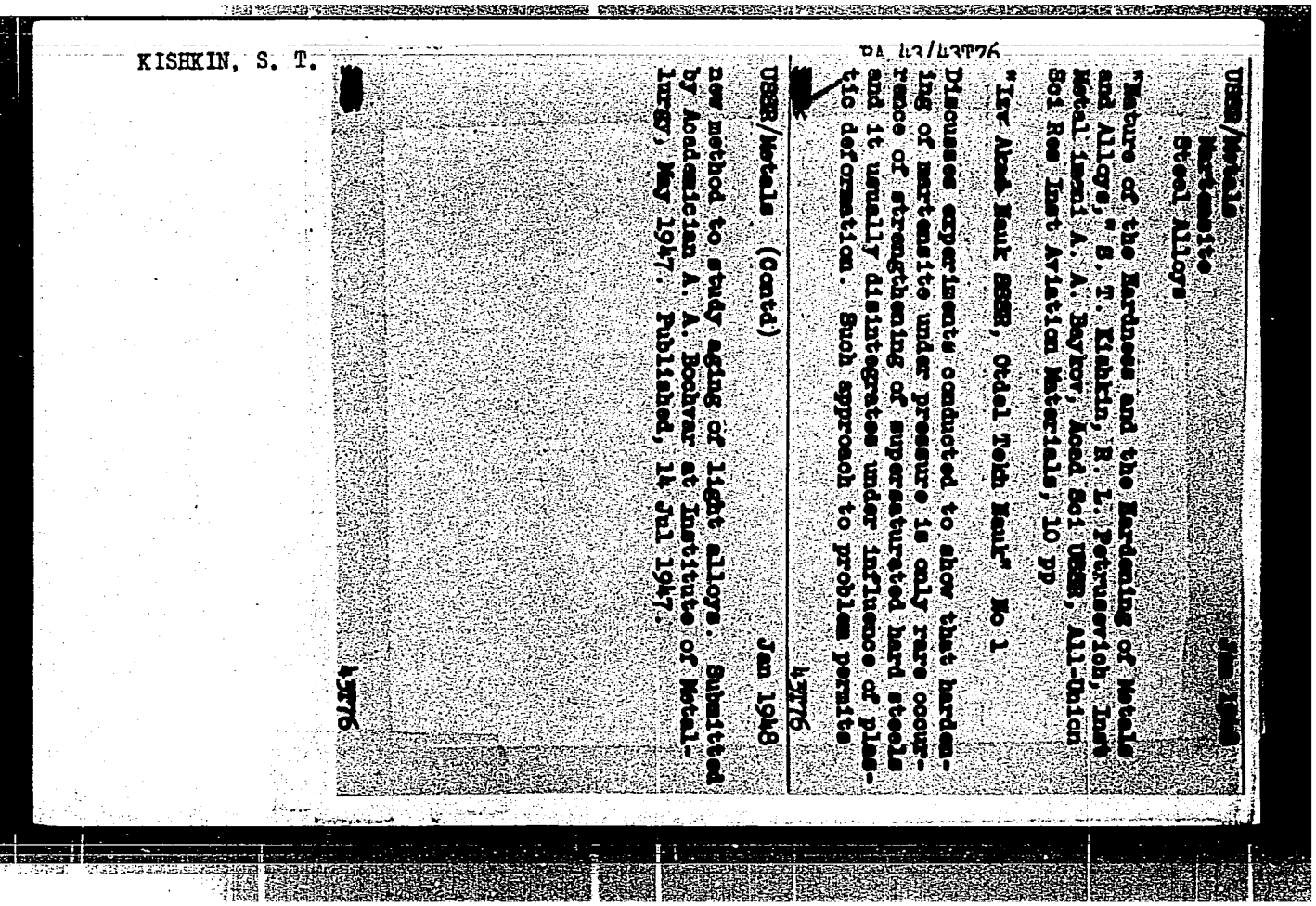
KISHKIN, S. T.

USSR/Metals Nov 1947
Charges, Electrostatic
Alloys - Properties

"Nature of Sensitivity to Concentrations of Charges by Highly Tensile Alloys," S. Z. Bokshtein, S. T. Kishkin, 3¼ pp
"Dok Ak Nauk SSSR" Vol LVIII, No 4

Extreme sensitivity of highly tensile alloys to concentrations of charges has for many years prevented use of such alloys in industries. It appeared that highly stable materials could in no way be adapted to use in machinery. Author explains this phenomenon, which is particularly noticeable in open-hearth steel, and discusses results of experiments. Submitted by Academician A. A. Bochvar, 17 May 1947.

PA 38T85



KISHKIN, S. T.

USSR/Metals Martensite Steel Alloys

"Nature of the Hardness and the Hardening of Metals and Alloys," S. T. Kishkin, N. I. Yevtushkin, Inst Metal Imeni A. A. Baykov, Acad Sci USSR, All-Union Sci Res Inst Aviation Materials, 10 pp

"Iz Akad Nauk SSSR, Otdel Tekh Nauk" No 1

Discusses experiments conducted to show that hardening of martensite under pressure is only rare occurrence of strengthening of supersaturated hard steels and it usually disintegrates under influence of plastic deformation. Such approach to problem permits

4776

USSR/Metals (Contd) Jan 1948

new method to study aging of light alloys. Submitted by Academician A. A. Bochvar at Institute of Metallurgy, May 1947. Published, 14 Jul 1947.

4776

KISHKIN, S. I.

Kishkin, S. I., "Carbide theory of Strengthening Steel." Symposium, "Increasing the Strength of Machine Parts, "Institute of Machine Studies, Academy of Sciences USSR , and All-Union Scientific Engineering-Technical Society of Machine Building (VNITOMASH), 1949.

KISHKIN, S.T.

RT-909 (Against formalism in the theory of plastidity) Protiv formalizma v teorii plastichnosti.
IZVESTIIA AKADEMII NAUK SSSR; OTDELENIE TEKHNICHESKIKH NAUK, (2): 266-278, 1950.

M. A.

Experimental Check of the Fundamental Law of the Plasticity Theory. S. T. Kishkin and S. I. Ratner (Zhur. Tekhn. Fiziki, 1949, 19, (3), 412-420; Appl. Mechanics Rev., 1950, 3, 77).—(In Russian). The object of the tests was to establish the relation between the yield stresses in shear (τ_y) and in tension (σ_y) for various materials. τ_y was defined as the shear stress at which the permanent set is 0·3% (which corresponds to 0·2% permanent set in tension) and was determined graphically. The ordinates of the stress-strain diagram were calculated according to the Nádai-Ludwig formula $\tau = (2\pi r^3)^{-1}(3M + \theta dM/d\theta)$ (The second term in the parentheses taking account of the strengthening effect of plastic deformation). The yield stress in tension σ_y was defined as the stress at which the permanent set is 0·2%. The ratio τ_y/σ_y, which according to Saint Venant has a value of 0·5, and according to the theory of Huber-Mises a value of 0·577, was found to vary from 0·25 for magnesium alloys to 0·74 for high-quality heat-treated steel. For pure metals with cubic crystal lattice (copper, iron, and aluminium) the ratio τ_y/σ_y is 0·48–0·49. For pure metals with hexagonal lattice the

ratio is very low, being 0.27 for pure magnesium. Annealed steel gives a value 0.5, whereas heat-treated steel can have a value as high as 0.7-0.8. The mean value for aluminium alloys is ~0.4, but some cast aluminium alloys give 0.67. K. and R. have also determined the value of the yield stress in torsion from the conventional formula $\tau_y = 16M/\pi d^3$, which was found to be 20-30% higher than the correct value calculated from the Mädi-Ludwig formula.

FD-1041

USSR/ Metallurgy - Strength of metals

Card 1/1 : Pub. 153 - 12/23

Authors : Kishkin, S. T. Nikolenko, V. V., and Ratner, S. I.

Title : Strength of metals in contact with melted solder

Periodical : Zhur. tekh. fiz., 24, 1455-1466, Aug 1954

Abstract : Conclude that brittle fracture of steel under the influence of melted solder occurs in the presence of definite elastic elongation, and that the tensile stress necessary for this depends upon the composition of the solder and also upon the duration of contact of the stressed steel with the solder and upon the composition of the steel itself. Observe that deposition of solder on non-stressed steel does not lower its resistance to fracturing. Four references, one USSR (Ya. M. Potak and O. I. Magazanik, Termicheskaya obrabotka i svoystva staley dlya samoletostroyemiya (Heat treatment and properties of steels for air-craft construction), Defense Press, No. 154, 1952).

Institution : - -

Submitted : 16 December 1953

KICHKIN S.T

The Mechanism of Weakening and Fracture of Crystalline Bodies with Time at High Temperatures. S. T. Kishkin (*Doklady Akad. Nauk S.S.S.R.*, 1954, 95, (4) 783-791). [In Russian]. Differences in behaviour of various metals and alloys subjected to const. tension at high temp are discussed. All cases of breaking can be represented by a similar curve of the strain/time diagrams, but static failure under load at high temp. occurs as a result of the development and propagation of intergranular cracks, in contrast with brittle failure at room temp., and fatigue failure at all temp., where the cracks appear inside the grains. The real difference between these types of failure lies in the fact that in the first case the cracks appear after only 10–20% and in the second case after 80–85% of the total time required for fracture. In this connection the problem of increasing the strength of the grain boundaries of high-temp.-resistant alloys is of great importance.

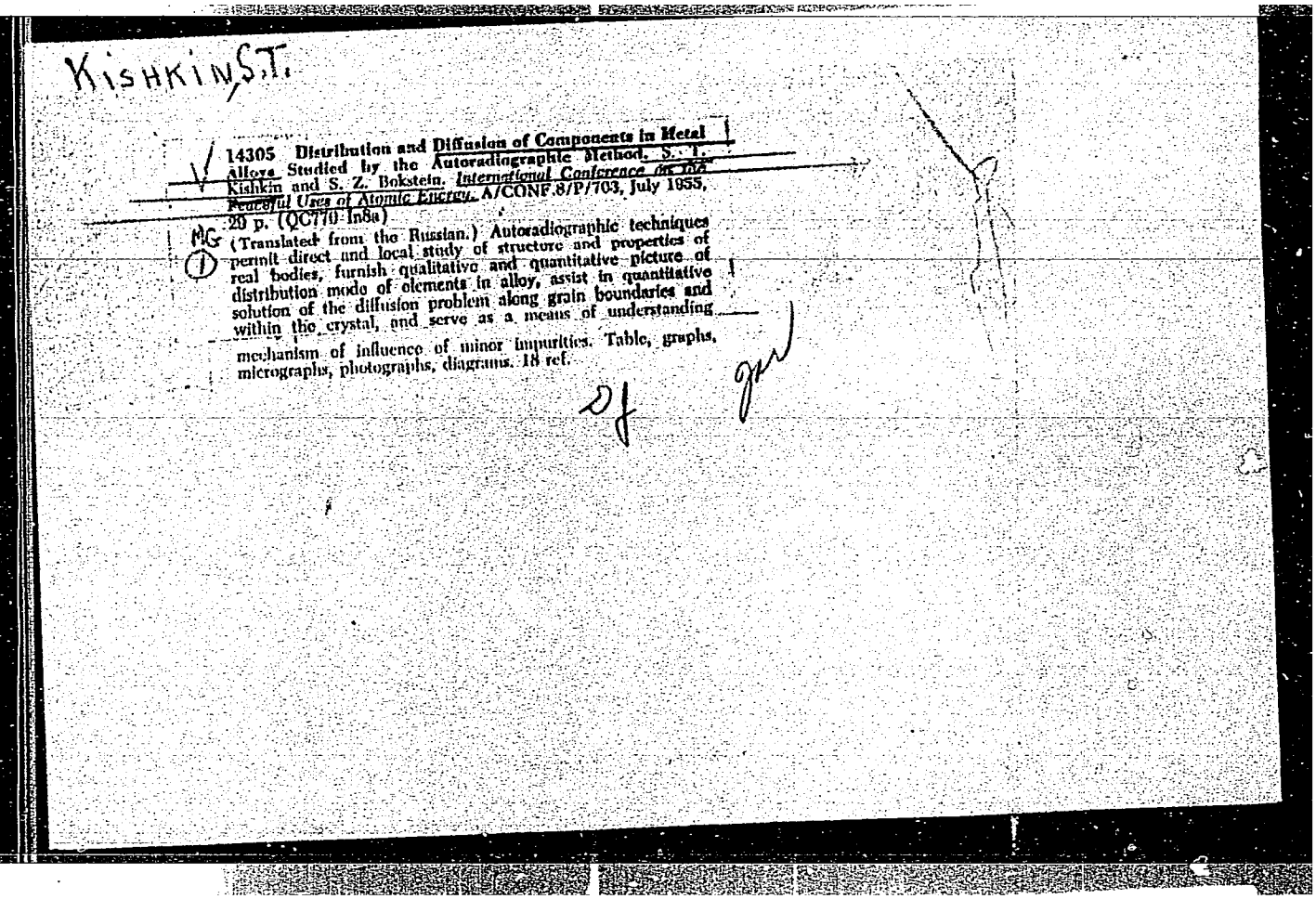
—S. K. L.

Evaluation B-80678, 22 Nov 54

KISHKIN, S.T.; BOKSHTEYN, S.Z.

[Investigating the distribution and diffusion of components in metal alloys by the method of autoradiography] Issledovanie raspredeleniia i diffuzii komponentov v metallicheskikh splavakh metodom avtoradiografii. Moskva, 1955. 20 p. (MIRA 12:11)

(Alloys--Metallography)
(X rays--Industrial applications)



KISHKIN, S.T.

14305 Distribution and Diffusion of Components in Metal Alloys Studied by the Autoradiographic Method. S. T. Kishkin and S. Z. Bokstein. *International Conference on the Peaceful Uses of Atomic Energy.* A/CONF.8/P/703, July 1955, 20 p. (QC770 In8a)

(Translated from the Russian.) Autoradiographic techniques permit direct and local study of structure and properties of real bodies, furnish qualitative and quantitative picture of distribution mode of elements in alloy, assist in quantitative solution of the diffusion problem along grain boundaries and within the crystal, and serve as a means of understanding mechanism of influence of minor impurities. Table, graphs, micrographs, photographs, diagrams. 18 ref.

Kishkin, S.T.

POTAK, Yakov Mikhaylovich; KISHKIN, S.T., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, retsenzent; FRIDMAN, Ya.B., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, retsenzent; ZILOVA, T.K., kandidat tekhnicheskikh nauk, redaktor; SUVOROVA, I.A., redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor.

[Brittle fracture of steel and steel parts] Khrupkie razrusheniia stali i stal'nykh detalei. Moskva, Gos.izd-vo obor.promysh.,1955. 388 p. (Steel--Brittleness) (MLRA 9:4)

KISHKIN, S. T.

UMANSKIY, Yakob Semenovich; FINKEL'SHTEYN, Boris Nikolayevich; BLANTER Mikhail Yevseyevich; KISHKIN, Sergey Timofeyevich; FASTOV, Nikolay Semenovich; GORELIK, Semen Samuilovich; STARODUBTSEVA, S.N., redaktor; ATTOPOVICH, M.K., tekhnicheskiy redaktor.

[Physical principles in the study of metals] Fizicheskie osnovy metallovedeniia. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1955. 721 p. (MLRA 8:8)
(Metals)

Translation 563703

KISHKIN, S.T.

Category : USSR/Solid State Physics - Phase transformation of solid bodies E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1226

Author : Bokshteyn, S.Z., Kishkin, S.T., Platonova, A.F., Popova, N.M
Title : Carbide Formation in Tempering of Chrome-Nickel Steels and Chrome-Nickel-Tungsten Steels

Orig Pub : Fiz. metallov i metallovedeniye, 1955, 1, No 3, 459-466

Abstract : An investigation was made of the carbide-formation in Cr -- Ni steel (C -- 0.4, Cr -- 1.96 and Ni -- 2.75%) and in Cr -- Ni -- W (C -- 0.38, Cr -- 1.71, Ni -- 2.09, and W -- 1.51%) steel after hardening from 960° and tempering, as a function of the temperature (200 -- 650°) and of the length of soaking (up to 300 hours), using the differential carbide analysis method. A procedure for such a test is given. It is shown that the decomposition of martensite terminates in the above steels at 400 -- 500°. In this case the carbide portion of the steel, depending on the tempering condition, consists either of a single iron carbide or simultaneously of cementite and chromium carbide. Carbide of the cementite type is formed at a tempering temperature of 400° and less or in the beginning instants of deep tempering. No trigonal chromium carbide is formed 300 hours at 400°, but it appears

Card : 1/2

Category : USSR/Solid State Physics - Phase transformation of solid bodies E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1226

after 50 hours at 500°, after one hour at 500°, and after five minutes at 560°. The amount of cementite increases at the start of the tempering, and diminishes upon the appearance of the chromium carbide (500 -- 550°). The maximum solubility of chromium in cementite reaches 20%, and that of tungsten reaches 2 -- 2.5%. Introducing tungsten into chrome-nickel steel reduces the amount of the special chromium carbide and reduces the solubility of the chromium in the cementite. A double carbide of iron and tungsten is formed by tempering at 600° (300 hours) and at 650° (50 hours).

Card : 2/2

Kishkin S. T.

✓A study of the influence of high-melting elements on the autodiffusion of iron by using the radioactive isotopes. S. Z. Bokshtein, V. A. Kazakova, S. T. Kishkin, and L. M. Mirskii. *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1955, No. 12, 18-37.—The autodiffusion of Fe in Fe-Ni alloy (around 25% Ni) was studied after the addn. of a third alloying element (Mo, Nb, Ti, or V) by electroplating a 3-4 μ-thick layer of Fe^{59} from a sulfate soln. upon an alloy plate 29 × 9 × 7 mm. in size, fastening 2 such plated strips with their active faces adjoining, enclosing them in quartz tubes, evacuating to a 10^{-4} mm. vacuum, and annealing at 1000, 1100, 1150, and 1200°. After each heat-treatment, thin layers were machined off along the active surfaces to a thickness controlled by sensitive micrometers and by microweighing. A low concn. of the third alloying elements was found sufficient to repress the iron polymorphic transformations; thus, with only 0.8% Ti only the α-Fe crystal lattice could be observed over the whole annealing temp. range. A table is given of the relation of the autodiffusion coeff. *D* and the concns. of the third element. Ni and V addns. lower the diffusional mobility of Fe and reduce the values of *D* and the autodiffusion energy. Mo, Nb, and Ti lower the Fe mobility, but raise the value of *D* and greatly increase the diffusion heat. It is concluded that the addn. of the last three alloying elements results in strengthening the at. bond energy, in accordance with the higher recrystn. temp. and the tensile strength of the alloys. W. M. S.

(3)

... Homogeneity of Alloys and Mobility Along ... with the Aid of Radioactive Isotopes. ... [illegible] ... [illegible] ... the autoradiographic method ... of the distribution of elements ... and suitable methods are described.

... obtained for carbon in cast steel (0·33% C), for tin in ... various elements in nickel are illustrated and ... During the study of the kinetics of element redistribution the possibility was noted of increased hetero- ... result of diffusional annealing. The mobility of components was found to be considerably greater in deformed than in cast alloys. Diffusion inside a crystal and along grain boundaries can be studied photometrically.—S. K.

KISHKIN, S.T.

62 A quantitative investigation of the distribution of the elements in alloys. S. T. Kishkin, S. Z. Bokshtein, L. M. Moroz, and T. I. Gudkova. *Doklady Akad. Nauk S.S.S.R.* 101, 667–70(1955).—The distribution was studied by autoradiography of alloys contg. radioactive isotopes. A 100x magnification of the autoradiograph gives a clear image of the distribution of the elements. A good agreement of the autoradiographs with the micrographic structure of the alloys is illustrated on an example of steel contg. 0.33% C. Large chem. nonhomogeneity was found within a single phase and within a single structure element of the alloys. Mo, Nb, Zr, and Sn are enriched in the boundary region of Ni and in the interdentritic spaces, while W is preferentially distributed along the dentritic axes. In Ni alloyed with Fe, the latter is found principally throughout the grain vol., while the boundaries are impoverished in it. S, P, Sb, etc., are arranged principally along the grain boundaries and in the interdendritic spaces. Nonhomogeneity is observed even in binary alloys, with a very small concn. of the added metal (below 0.01%). The nonuniformity cannot be explained by the surface tension phenomena. W. M. Sternberg

(3)

KISHKIN, S. T.

USSR/ Physics - Metal diffusion

Card 1/1 Pub. 22 - 18/49

Authors : Bokshteyn, S. Z.; Kishkin, S. T.; Moroz, L. M.; and Gudkova, T. I.

Title : Studying the internal and surface diffusion of metal granules by the auto-radio-graphic method

Periodical : Dok. AN SSSR 102/1, 73-76, May 1, 1955

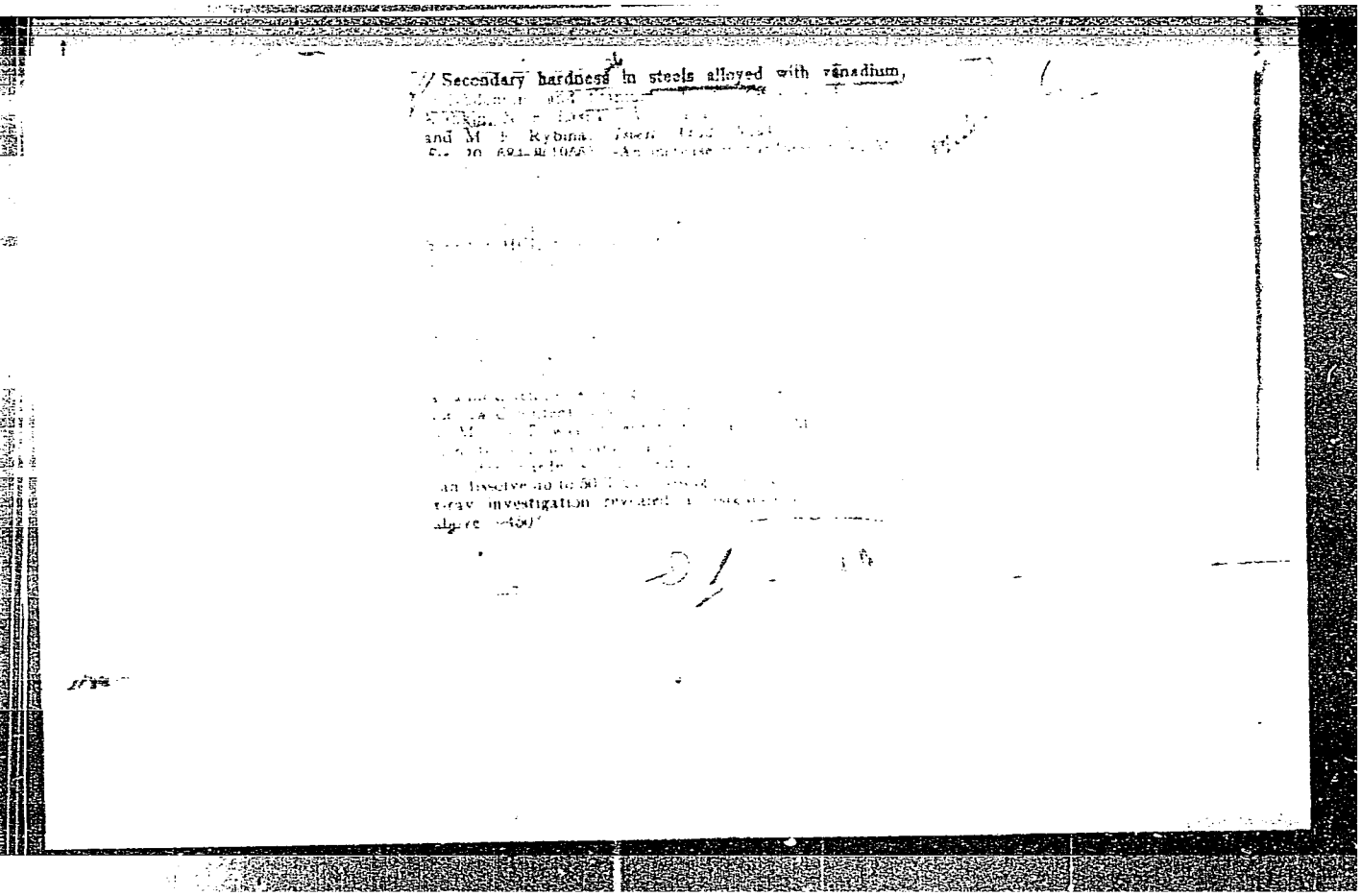
Abstract : Experiments intended to establish a certain law of a metals' diffusion are described. Tin, iron and nickel were used in the experiments. The diffusion of tin molecules with surface and volume (internal) molecules of iron and nickel was determined by the auto-radio-graphic method. Results are presented. Eight references: 2 USA and 6 USSR (1931-1953). Graphs; illustrations.

Institution : .....

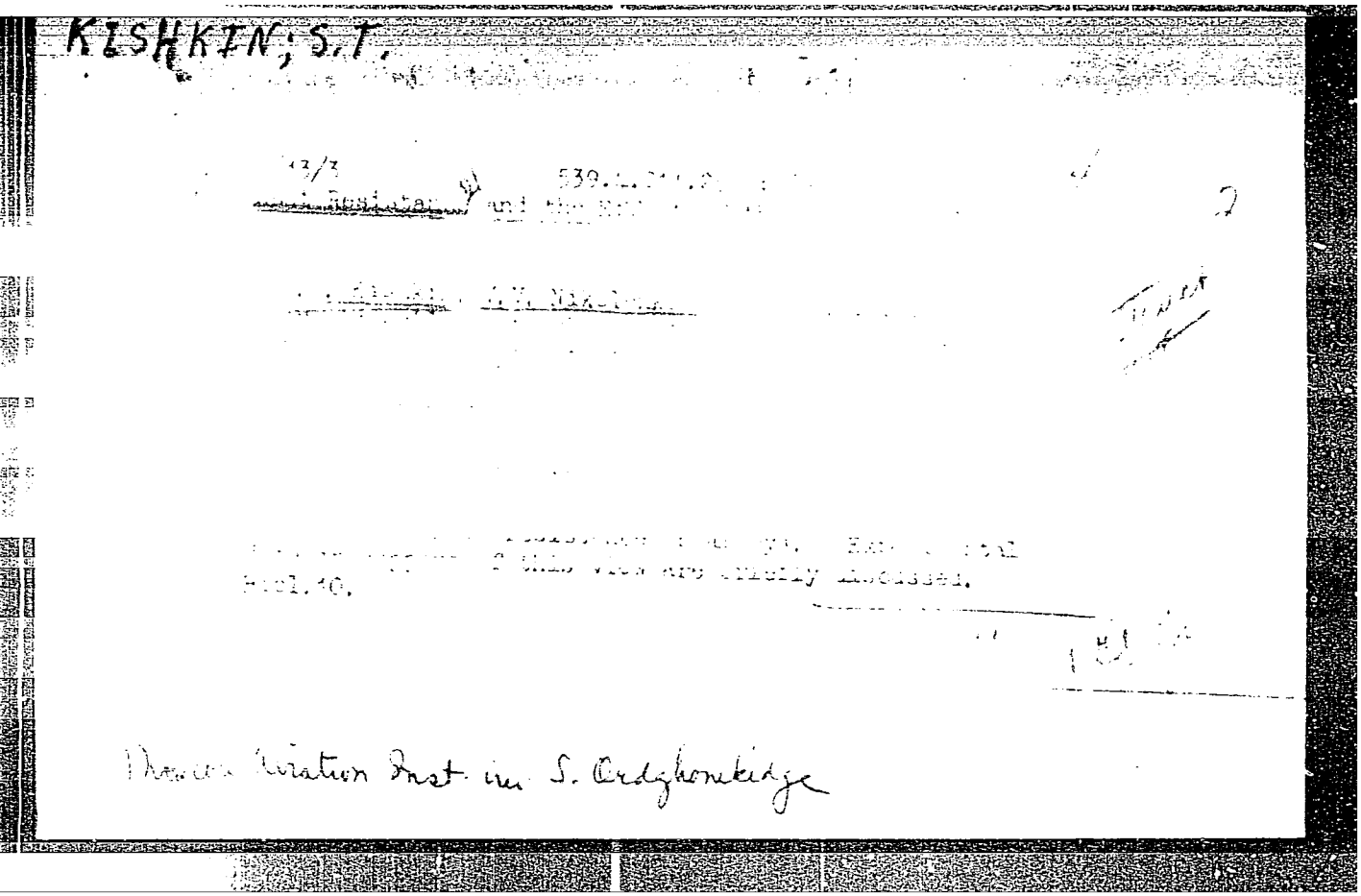
Presented by : Academician G. V. Kurdyumov, July 15, 1954

KISHKIN, S.T.; SULIMA, A.M.; STROGANOV, V.P.; MALYSHEV, M.V., redaktor; BELITSKAYA, A.M.; izdatel'skiy redaktor; LEBEDEVA, L.A., tekhn. redaktor.

[Investigating the effect of cold working on the mechanical properties and the structure of EI437A alloy] Issledovanie vlivaniia naklepa na mekhanicheskie svoistva i strukturu splava EI437A. Moskva, Gos.izd-vo oboronnoi promyshlennosti, 1956. 85 p. (Moscow Aviatsionnyi institut. Trudy, no.71) (MLRA 9:12)
(Nickel-chromium alloys--Cold working)
(Heat resistant alloys--Cold working)



Secondary hardness in steels alloyed with vanadium



KISHKIN, S. T.

"Effect of Metal Composition and Structure on Grain Boundary Diffusion," S. Z. Bokshteyn, S. T. Kishkin, and L. M. Moroz, Moscow Aviation Inst, USSR.

Paper submitted for presentation at the International Conference on Radioisotopes in Scientific Research, Paris, 9-20 Sep 1957.

KISHKIN, S.T.

137-58-5-10603

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 249 (USSR)

AUTHOR: Kishkin, S. T., Panasyuk, I. O.

TITLE: On the Brittleness of Chromium (O khrupkosti khroma)

PERIODICAL: V sb.: Issled. po zharoprochn. splavam. Vol 2. Moscow, AN SSSR, 1957, pp 135-140

ABSTRACT: Bibliographic entry. Ref. RzhMet, 1957, Nr 12, abstract 24997

1. Chromium--Mechanical properties

Card 1/1

KISHKIN S.T.

129-2-1/10

AUTHOR: Bokshteyn, S.Z., Dr. of Technical Sciences Prof., Kishkin, S.T., Dr. of Technical Sciences Prof. and Moroz, L.M., Eng.

TITLE: Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam zerna).

PERIODICAL: Metallovedeniye i obrabotka metallov, 1957, No. 2, pp 2-10 (U.S.S.R.)

ABSTRACT: In a series of papers V.I. Arkharov et alii (14, 15) show, on the basis of metallographic analysis, that there is preferential diffusion of a number of elements along the grain boundaries of iron, nickel and copper. Gruzin, P.L., Kuznetsov, E.V. and Kurdyumov, G.V. (22) studied the diffusion of iron in the alloys iron-nickel and iron-nickel-carbon (25% Ni, 0.69% C) and found that the straight lines expressing the dependence lg D on 1/T show a break at 1000 to 1100°C. The inclination angle at lower temperatures indicates lower values of the activation energy compared with respective high temperature values; this dependence was observed only if the alloy was subjected to martensite transformation prior to diffusion annealing. In fact, the diffusion coefficient at 900°C in this case is three times as large as for specimens which have not been subjected to martensite transformation, i.e. 7.65×10^{-12} and 2.35×10^{-12} cm^2/sec respectively. Apparently, the influence of earlier transformations

Card 1/5

TITLE: Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam zerna).

is nullified only after heating the specimens to 1000 to 1100 C. Earlier investigations by the authors of this paper (21, 23) by means of auto-radiography methods indicates that this process is nonuniform in a polycrystalline body and has a pronounced local character. The process of self-diffusion of iron was investigated by means of an auto-radiography method described earlier by the authors of this paper (21,23). 20 x 10 x 10 mm specimens of Armco iron (0.028% C, 0.030% S, 0.017% P, 0.12% Si, 0.22% Mn) were coated with radio-active Fe^{59} in an electrolytic bath of such a composition that the coating can be effected at room temperature, is not liable to oxidation, is stable in operation and does not have to be frequently corrected. During 10 to 15 minutes an 0.2 to 0.5 μ thick radio-active iron layer was deposited with an activity of 4000 to 7000 imp/cm min. For self-diffusion of the iron in the α and the γ states annealing was effected in the temperature range 800 to 1200°C, maintaining the temperature constant within 2°C. At

TITLE: Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob"yeme i po granitsam zerna).

first the qualitative self-diffusion of iron was studied at 800, 1000, 1100 and 1200°C. Fig. 1 shows auto-radiograms of specimens after diffusion annealing at 800,1000 and 1200°C. Fig. 2 shows the measured values of the depth of self-diffusion of iron in the grain for 1000°C. Fib. 3 shows the dependence of the density of blackening on the depth of self-diffusion of iron along the grain boundaries. Fig. 4 shows the temperature dependence of the self-diffusion coefficient of iron inside the grain and along the grain boundaries. Measured values of the influence of the temperature on the coefficient of self-diffusion inside the grain and along the grain boundaries are given in a table on p. 8. As a result of the tests, the character of the process of self-diffusion of iron in the α and the γ states was determined. It is shown that displacement of atoms during self-diffusion of the iron takes place predominantly along the grain boundaries within a wide range of temperatures (800 to 1200°C) and is independent on the type of crystal lattice. For the temperature dependence of the coefficient of self-diffusion of γ iron the relations were determined separately

Card 3/5

TITLE: Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob"yeme i po granitsam zerna).

for the grain boundary and for the grain volume, namely:

$$D_{boundary} = 2.3e^{-30\,600/RT}$$

$$D_{grain} = 0.16 \times 10^{-6}e^{-64\,000/RT}$$

Although conserving a high mobility along the crystal boundaries in the case of self-diffusion right up to 1200°C, a decrease is observed in the speed of diffusion with increasing temperatures, namely:

$D_{boundary}/D_{grain}$ (at 1000°C) 12 000

Card 4/5 $D_{boundary}/D_{grain}$ (at 1200°C) 2 500.

Kish Kin, S. T.

129-12-5/11

AUTHORS: Kishkin, S.T., Doctor of Technical Sciences, Prof. and Klypin, A.A., Candidate of Technical Sciences.

TITLE: Mechanism of disruption of the alloy ЭИ437 under conditions of operation at elevated temperatures for long durations. (Mekhanizm razrusheniya splava EI437 v usloviyakh dlitel'noy raboty pri povyshennykh temperaturakh).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1957, No.12, pp. 36-40 (USSR)

ABSTRACT: Available data indicate that creep is accompanied by development of cracks (Refs.1-3). Crack formation due to reduced breaking strength is one of the types of exhaustion of the strength with the progress of time. The reduction of the breaking strength with time is associated with a change in the structure under the influence of temperature and creep along the grain boundaries. In this paper disruption of the alloy ЭИ 437 at elevated temperatures is investigated and also the influence of forming cracks on the strength properties. Forged rods of the alloy were subjected to heat treatment and at a constant load the time taken to disrupt the specimen was determined. Tests with periodic heating

Card 1/3

Mechanism of disruption of the alloy ЭИ 437 under conditions of operation at elevated temperatures for long durations.

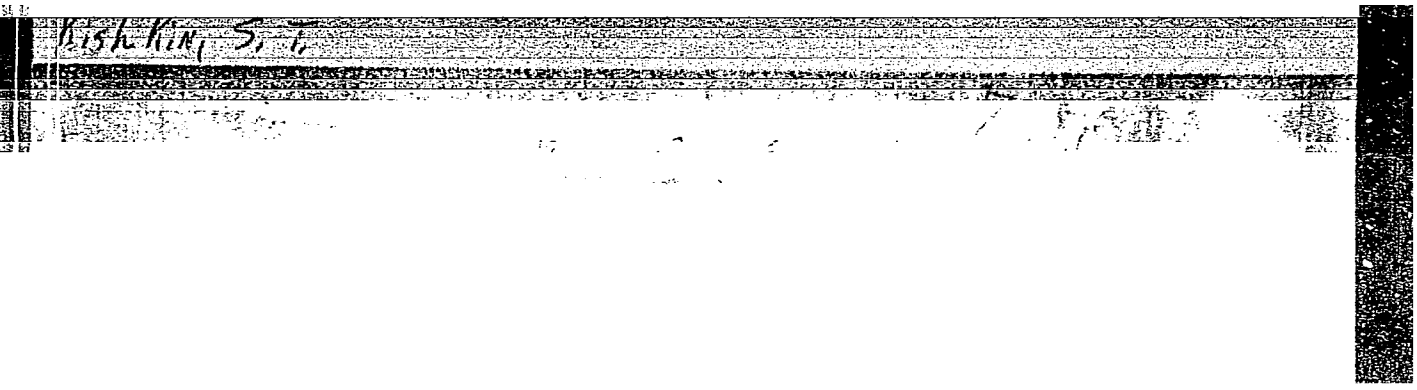
and cooling were made by the same set-up, except that the furnace had a changed design inasmuch as it was possible to subject the loaded specimen to an air blast perpendicular to its axis. The hardness of the melt during isothermal annealing at 700°C for 100 hours increases intensively, as can be seen in Fig.1; no hardness increase was observed at 800°C. The increase in hardness indicates that the strength of the investigated alloy increases as a result of the formation of finer phases which block plastic deformation. The disruption at a constant load cannot be associated with coagulation and with dissolution of hardening phases, for a time interval of 100 hours. Metallographic investigation on specimens which permit observation of the changes in the structure during the tests have shown that, in the case of long duration stresses, fine cracks occur. During the remaining time until disruption, growth of the existing cracks and formation of new ones continues. Fig.2 shows the creep curve of a specimen tested at 800°C with a stress of 25 kg/mm^2. The graph, Fig.5, shows the

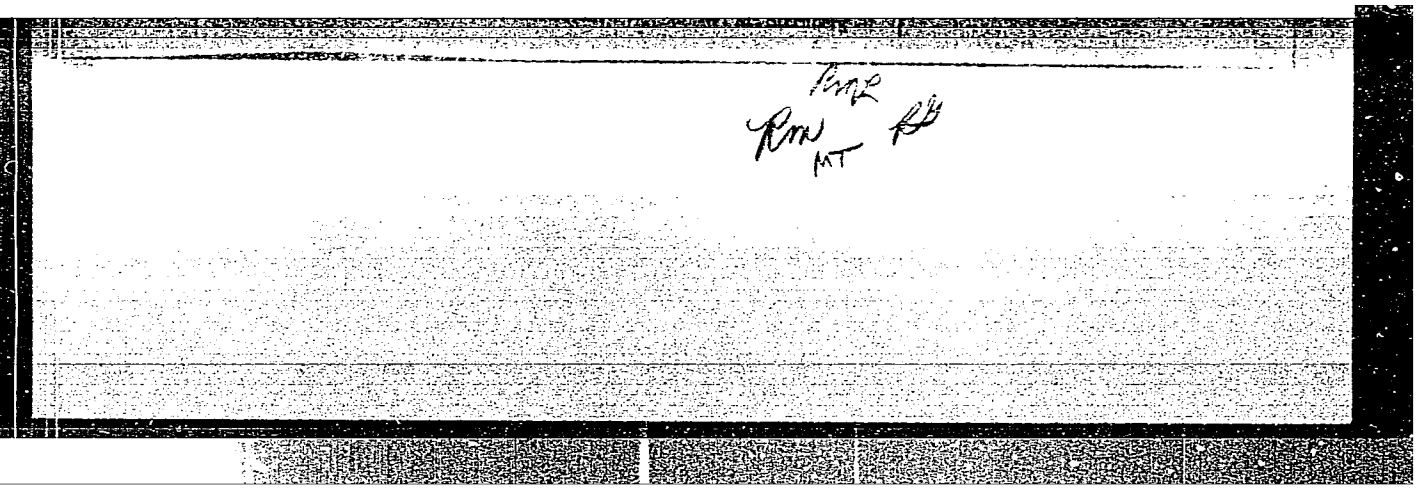
Mechanism of disruption of the alloy ЭИ437 under conditions of operation at elevated temperatures for long durations.

influence of preliminary loading on the short duration strength of the alloy at 800°C; Fig.6 shows the influence of preliminary loading on the long duration strength at 800°C and a stress of 20 kg/mm^2; Fig.7 shows the influence of preliminary loading on the short duration strength of the alloy ЭИ 437 without removal and after removal of the surface layer at 800°C; Fig.8 shows the influence of preliminary loading on the short duration strength of the alloy at 700°C. On the basis of the results, the author concludes that disruption of the alloy ЭИ 437 under conditions of long duration loading at elevated temperatures is due to the formation of cracks at the initial creep stage. Formation and development of cracks in this alloy at 700 and 800°C and long duration static loading takes place exclusively along the grain boundaries in a direction perpendicular to the acting forces, which proves that the breaking strength along the grain boundaries is low. Acceleration of the disruption in the case of repeated heating and cooling is associated with a more intensive formation of cracks. There are 8 figures and 5 references, 3 of which are Slavic.

Card 3/3

AVAILABLE: Library of Congress.





Kishkin, S.T.

AUTHORS: Gudkova, T.I., Gorbatov, V.S., Bokshteyn, S.Z., Zhukhovitskiy, A.A., Kishkin, S.T. 32-12-19/71

TITLE: A Method of Investigating the Influence Exercised by Tension and Deformation Upon the Self-Diffusion of Iron (Metodika issledovaniya vliyaniya napryazheniya i deformatsii na samodiffuziyu zheleza).

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1438-1439 (USSR)

ABSTRACT: In an Institute of the AN USSR, which is not mentioned here, a special device was constructed which makes it possible to carry out diffusion red hot heating in the vacuum, in which the diffusion properties of the samples can be investigated by making use of traction at the conditions of elastic and plastic deformation. The apparatus consists of a combination of the test-machine "ВП-8", a steel vacuum camera having a diameter of 200 mm, and containing an electric furnace of 110 mm length and the necessary measuring devices. The flat samples of slightly carboniferous steel (0,1%C; 0,35%Mn; 0,024%P; 0,015%S) were subjected to traction in the machine up to the degree of extension and destruction. Because of the decrease of structural tensions the samples were previously softened in the vacuum at 1000°, after which they were on one side and on a surface of 1 cm² provided with a coating of electrolytic iron which served as diffusion

Card 1/2

A Method of Investigating the Influence Exercised by Tension and Deformation Upon the Self-Diffusion of Iron 32-12-19/71

object. The results obtained are shown together in a table. It was found that the self-diffusion of iron under certain conditions develops mainly according to the structural grain boundaries, and that the circumstances of the application of fraction as well as of the high temperature accelerate the diffusion of iron. The plastic deformation of the sample increases the self-diffusion of iron by nearly the three-fold, which is explained by the atomic motion which sets in. At the same time, however, the activation energy in the corresponding domain of the sample is diminished. Iron with a 0,1%C-content enters into the two-phase state (α - γ) at 750-800°, but because the α -phase remains predominant, it also determines the velocity of the diffusion current. There are 1 table and 9 Slavic references.

AVAILABLE: Library of Congress

Card 2/2 1. Iron-Self diffusion-Determination 2. Instrumentation
3. Iron-Tension 4. Iron-Deformation

KISHKIN, S. T.

Category: USSR / Physical Chemistry - Crystals B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29696

Author : Kishkin S. T., Nikolenko V. V.
Inst : ~~Academy of Sciences~~ USSR
Title : Heat Resistance and Effect of the Medium

Orig Pub: Dokl. AN SSSR, 110, No 6, 1018-1021

Abstract: The effect of low-melting admixtures (Pb, Sn, Bi, Sb, etc), which are usually deposited along the grain boundaries and drastically decrease the heat resistance of alloys, is interpreted on the basis of notions, evolved by P. A. Rebinder, concerning the effect of surface-active substances on surface energy and the strength of polycrystalline solids and monocrystals.

Card : 1/1 -20-

20-6-21/59

AUTHOR KISHKIN, S.T., PANASYUK, I.O.,

TITLE On the Brittleness of Chromium.
(O khrupkosti khroma - Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 6, pp 1263-1264 (U.S.S.R.)

ABSTRACT It is possible to understand the viscosity of chromium if one takes into consideration the scheme of the viscous and of the brittle fracture (as proposed by A.F. Ioffe) as well as the experimental data on chromium and its alloys. According to these concepts, the resistance to rupture must remain relatively constant in a rather large temperature interval and decrease only at sufficiently high temperatures. The experimental results obtained by the authors of the paper under review suggest that with increasing temperature the resistance to rupture of the polycrystalline commercial chromium increases but does not remain constant. Up to a certain temperature the elongation equals zero, but then the elongation increases and the brittle fracture goes over into a viscous fracture. But if the threshold value of the cold-shortness of chromium depends on the melting temperature, then the transition from the viscous to the brittle fracture should actually take place below the normal temperature. Also in the steels which are hardened on martensite the resistance to rupture increases if the annealing temperature is raised. It is probable that all elements which dissolve in the one or the other metal in accordance with the principle of penetration (similarly to carbon in iron) are in a position to strongly deform the crystal

Card 1/2

...on basis of this fact, the following can be explained: Commercial chromium is not a pure metal but rather an alloy, with a crystal lattice, which is deformed in single parts of the grains. The elements which form solid penetration-solutions have a different influence on the plasticity of chromium. The paper under review discusses some details, particularly the connection of the penetration [illegible] nitrogen. The heterogeneity of the solid solution and the difference in the phases of commercial chromium make it brittle. Nitrogen is one of the most harmful admixtures.
(1 reproduction).

ASSOCIATION All-Soviet Scientific Research Institute for Aviation Materials
PRESENTED BY REBINDER P.A., Member of the Academy,
SUBMITTED 24.3.1956
AVAILABLE Library of Congress
Card 2/2

25(1) PHASE I BOOK EXPLOITATION SOV/1922

Kishkin, Sergey Timofeyevich

Vliyaniye obluchen'ya na struktury i svoystva konstruktsionnykh metallov (Effect of Irradiation on Structure and Properties of Structural Metals) Moscow, Oborongiz, 1958. 39 p. Number of copies printed not given.

Ed.: M.S. Lagovskaya.

PURPOSE: This book may be used by students and Aspirants studying physical metallurgy as well as by scientific workers in the field.

COVERAGE: The book is based on a series of lectures read by the author at the Moscow Institute of Aviation imeni S. Ordzhonikidze. These lectures deal primarily with the effect of radiation on the properties and behavior of metals and alloys. The author discusses the changes in the atomic lattice of metals due to radiation and known as the Frenkel' defect. It is said that the strongest effect on the structural properties of metal is produced by neutrons, which, because they lack an electric charge, are capable of

Card 1/3

penetrating the crystal lattice and causing various alterations therein. Other effects of radiation on certain ferrous and nonferrous metals are listed and tabulated. In conclusion it is stated that the Frenkel' defect in the crystal lattice is responsible for the basic structural change in metals that determines their physical and mechanical properties. There are 24 references, of which 14 are Soviet, 9 English, and 1 Austrian. The only personality mentioned is Y.I. Frenkel', who developed the theory of structural changes in the crystal lattice due to radiation.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

GO/ad
6-16-59

18(7)
AUTHORS: Bokshteyn, S. Z., Zhukhovitskiy, A. A., SOV/163-58-4-26/47
Kishkin, S. T., Mal'tsev, E. R.

TITLE: Influence of the Phase Conversion on the Speed of Autodiffusion (Vliyaniye fazovykh prevrashcheniy na skorost' samodiffuzii)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4, pp 158-161 (USSR)

ABSTRACT: The influence of eutectoid conversion in steel on the speed of autodiffusion in iron is explained. Besides, some experiments were made to measure the effect of polymorphic conversion $\alpha \rightleftarrows \gamma$ on the speed of autodiffusion. The influence of eutectoid conversion (austenite-perlite) in steel U8 (0.78 % C) on the speed of autodiffusion in iron was investigated. For determining the diffusion parameters, the usual variant of the absorption method (Ref 2) was used. The diffusion factor was calculated according to the theory (Ref 3). It is shown that the eutectoid conversion increases considerably the average mobility of the atoms in the lattice. In examining the influence of the polymorphic $\alpha \rightleftarrows \gamma$-conversion on the autodiffusion of iron (0.059 % C), one of the variants

Card 1/3

of the absorption method, the so-called "method of the thin layer" (quotation marks in the Russian original) (Ref 2) was used for determining the factors of autodiffusion in iron. The data obtained show that the autodiffusion of iron in cyclic annealing, when the $\alpha \rightleftarrows \gamma$-conversion is imposed on the diffusion process, proceeds at about the same speed as the autodiffusion of α-iron in isothermic annealing at 880°. Thus, the polymorphic conversion does not change the speed of autodiffusion, in contrast to the eutectoid conversion. The formation of the new phase and the corresponding lattice reconstruction may lead to an increase of mobility of the iron atoms on account of a number of causes mentioned here. The polymorphic $\alpha \rightleftarrows \gamma$-conversion has apparently no noticeable influence on the elementary act of autodiffusion of iron. Thus, the two processes may be regarded independent of each other. This result can be explained by supposing that - in the case of substituting a crystalline iron atom packing by another - the atoms do not shift by great distances but only by distances smaller than the interatomic distance. In contrast with the polymorphic conversion, the eutectoid conversion in

Influence of the Phase Conversion on the Speed of Autodiffusion SOV/163-58-4-26/47

steel increases the speed of autodiffusion of the iron considerably (by one order of magnitude). There are 1 figure, 2 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy institut stali i VIAM (Moscow Steel Institute and VIAM)

SUBMITTED: May 22, 1958

Card 3/3

SOV-129-58-6-5/17

AUTHORS: Kishkin, S. T. (Dr.Tech.Sci.Prof.), Klypin, A. A. and Sulima, A. M. (Cands.Tech.Sci.)

TITLE: Influence of the Plastic Deformation on the High Temperature Strength of the Alloy EI437 (Vliyaniye plasticheskoy deformatsii na zharoprochnost' splava EI437)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 6, pp 18-21 (USSR)

ABSTRACT: The aim of the here-described work was to study the properties of the alloy EI437 after preliminary plastic deformation and to establish the mechanism of failure of this alloy at 500, 700 and 800°C. The technique and the results are described. The authors arrived at the following conclusions: (1) The plastic deformation has an important influence on the service life of dispersion hardened high temperature alloys of the type EI437, reducing the service life considerably at 700 to 800°C. (2) The influence of plastic deformation is linked with an acceleration of the diffusion processes which form the basis of dispersion hardening and which lead to a decrease in the breaking strength; at low temperatures when there is no appreciable acceleration of the diffusion processes, the factor of breaking up of the grains of the metal into blocks pre-

Card 1/2

SOV/20-121-6-17/45

18(7)

AUTHORS: Bokhshteyn, S. Z., Gudkova, T. I., Zhukhovitskiy, A. A., Kishkin, S. T.

TITLE: On the Influence of Irreducible Structure Modifications Which Occur During a Plastic Deformation on the Diffusion Mobility (O vliyanii neobratimykh strukturnykh izmeneniy, voznikayushchikh pri plasticheskoy deformatsii, na diffuzionnuyu podvizhnost')

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 6, pp 1015-1018 (USSR)

ABSTRACT: This paper investigates the influence of a previous plastic deformation at a high temperature on the diffusion of zink in nickel. This investigation is carried out separately for the volume and for the boundaries of the grains. The previous deformation of the plain samples were carried out by means of expanding tensions $\sigma = 6$ kg/mm^2 at a temperature of 700° in the course of 5; 25; 50; and 60 hours. The diffusion currents were determined by autoradiography of an oblique section. The experimental results are given in a table and in a diagram. According to these results, a previous deformation increases considerably the velocity of the diffusion of tin in nickel

Card 1/3

On the Influence of Irreducible Structure Modifications Which Occur During a Plastic Deformation on the Diffusion Mobility

(on the boundary and also in the volume). The volume modification is modified much more than the diffusion on the boundaries. For small deformations, the effect upon the boundaries and upon the grain has the same intensity. According to the analysis of the autoradiograms, the diffusion mainly takes place along the grain boundaries. The influence of the grain boundaries on the diffusion velocity decreases if the previous plastic deformation becomes more intensive. The above-given results may be explained by the following assumption: The plastic deformation at high temperatures causes essential modifications of the microstructure of the alloy. These modifications are irreversible or the initial state may be restored only by a heating of the samples to sufficiently high temperatures. According to an X-ray investigation, the above-discussed previous deformation at high temperatures noticeably diminishes the size of the blocks left after diffusion tempering. The results found for the diffusion of tin in nickel at 800° in the course of 100 hours are given in a table. The irreducible modifications of the structure exercise considerable influence on the diffusion mobility during

On the Influence of Irreducible Structure Modifications Which Occur During a Plastic Deformation on the Diffusion Mobility

the plastic deformation. A previous plastic deformation intensifies diffusion considerably. There are 3 figures, 2 tables, and 10 references, 6 of which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut aviatsionnykh materialov
(All-Union Scientific Research Institute of Aircraft Materials)

PRESENTED: April 19, 1958, by G. V. Kurdyumov, Academician

SUBMITTED: April 1, 1958

KISHKIN, S.T.

SOV/3726

PHASE I BOOK EXPLOITATION

Bokshteyn, Samuil Zeylikovich, Sergey Timofeyevich Kishkin, and Lita Markovna Moroz

Issledovaniye stroyeniya metallov metodom radioaktivnykh izotopov (Study of the Structure of Metals by the Method of Radioactive Isotopes) Moscow, Oborongiz, 1959. 217 p. Errata slip inserted. 3,200 copies printed.

Reviewer: A.A. Zhukhovitskiy, Doctor of Chemistry, Professor; Ed.: A.G. Rakhshtadt, Candidate of Technical Sciences, Docent; Ed. of Publishing House: L.I. Sheynfayn; Tech. Ed.: V.P. Rozhin; Managing Ed.: A.I. Sokolov, Engineer.

PURPOSE: The book is intended for scientific workers and engineers specializing in metallurgy and the physics of metals.

COVERAGE: This book deals with the problem of the nonhomogeneity of metal alloys and the state of the metal at the interfaces, in particular at

Card 1/6

Study of the Structure (Cont.) SOV/3726

the grain boundaries. The methods and results of investigations of the chemical nonhomogeneity of various alloys and of diffusion along the grain boundaries are presented. The authors devote considerable attention to methods and techniques of using tagged atoms in investigating distribution and diffusion processes. Engineer T.I. Gudkova participated in the experimental investigations of distribution processes of alloy components. The authors thank Professor A.A. Zhukhovitskiy, Doctor of Chemistry, and A.G. Rakhshtadt, Candidate of Technical Sciences. There are 47 references: 35 Soviet, 11 English, and 1 German.

TABLE OF CONTENTS:

Card 2/6

KISHKIN, S.T.

24(6) PHASE I BOOK EXPLOITATION SOV/2385

Akademiya nauk SSSR

Nekotoryye problemy prochnosti tverdogo tela; sbornik statey (Some Problems in the Strength of Solids; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 386 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V. I. Aver'yanov; Tech. Ed.: R. S. Pevzner; Editorial Board: A.F. Ioffe, Academician; G. V. Kurdyumov, Academician; S. N. Zhurkov, Corresponding Member, USSR Academy of Sciences; B. P. Konstantinov, Corresponding Member, USSR Academy of Sciences; F. F. Vitman, Doctor of Physical and Mathematical Sciences, Professor (Resp. Ed.); L. A. Glikman, Doctor of Technical Sciences, Professor; N. A. Zlatin, Doctor of Physical and Mathematical Sciences; V. A. Stepanov, Doctor of Technical Sciences; Ya.B. Fridman, Doctor of Technical Sciences, Professor; B. S. Ioffe, Candidate of Technical Sciences (Deputy Resp. Ed.).

PURPOSE: This book is intended for construction engineers, technologists, physicists and other persons interested in the strength of materials.

COVERAGE: This collection of articles was compiled by the Otdeleniye fiziko-matematicheskikh nauk AN SSSR (Department of Physical and Mathematical Sciences) and the Fiziko-tekhnicheskiy institut AN SSSR (Institute of Applied Physics, Academy of Sciences, USSR) in commemoration of the 80th birthday of Nikolay Nikolayevich Davidenkov, Member of the Ukranian Academy of Sciences, founder and head of the Otdel prochnosti materialov (Department of the Strength of Materials) at the Institute of Applied Physics, Academy of Sciences, USSR, founder of the Fakul'tet fizicheskogo metallovedeniya (Department of Physical Metallurgy) at the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943), the Order of the Red Banner of Labor (1945) and the Order of Lenin (1953). The articles deal with the strength of materials, phenomena of imperfect elasticity, temper brittleness, hydrogen embrittlement, cold brittleness, influence of deformation speed on the mechanical properties of materials, fatigue of metals, and general problems of the strength, plasticity, and mechanical properties of nonmetals. Numerous personalities are mentioned in the introductory profile of Professor Davidenkov. References are given at the end of each article.

23

BOKSHTEYN, S.Z.; GUDKOVA, T.I.; ZHUKHOVITSKIY, A.A.; KISHKIN, S.T.

Effect of stress and deformation on diffusion processes.
Issl.po zharopr.splav. 4:158-164 '59. (MIRA 13:5)
(Diffusion) (Deformations(Mechanics))

SOV/129-59-5-3/17

AUTHORS: Dr. Tech. Sci. Prof. S.T. Kishkin; Cand. Tech. Sci. A.A. Klypin

TITLE: Influence of Repeated Heating and Cooling on the Changes in the Properties of Steels and Alloys (Vliyaniye mnogokratnykh nagrevov i okhlazhdeniy na izmeneniye svoystv staley i splavov)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 5, pp 15-19 (USSR)

ABSTRACT: The aim of the work described in this paper was to study the influence of cyclic heating and cooling on the mechanical properties of certain steels and of the alloy EI-437. The heating was effected by induction, using a 200 kc/sec current supplied from a 60 kW tube oscillator. The specimen was cooled with water or with air, the feed rate of which was controlled by two electric valves. The circular specimens of 5 mm diameter, which were used for short and long duration tests, were subjected to heating and cooling according to a pre-determined regime. Prior to the tests the specimens were heat treated so as to exclude the influence of previous heat treatment. The specimens were heated on a 8 to 10 mm long section in the

Card 1/3

Influence of Repeated Heating and Cooling on the Changes in the Properties of Steels and Alloys

middle and in this section the temperature was maintained practically equal at the various points of the surface. The heating temperature for the steels was 550, 700 and 780, 850°C; for the stainless steel IKh18N9T and for the alloy EI-437 the heating temperature was 800°C. The heating duration was 2 to 4 seconds. In Figs 1 to 4 the changes are graphed of the various mechanical properties of the tested steels and alloys as a function of the number of heating cycles. On the basis of the obtained results the following conclusions are arrived at: 1) As a result of cyclic heating above 780°C and cooling, the strength will decrease with increasing content of the carbon on the steel. This is attributed to a decrease in the tensile strength of the material with increasing carbon content. 2) The drop in strength and plasticity with increasing number of heating cycles of all the materials investigated in these experiments is attributed to the formation of microcracks at the surface of the specimens. 3) Appearance of microcracks during heating below the critical range is associated with thermal

Influence of Repeated Heating and Cooling on the Changes in the Properties of Steels and Alloys

stresses occurring during rapid cooling. An increase in the cycle temperature and also in the cooling speed leads to a more intensive development of cracks. 4) In the alloy EI-437 the cracks were exclusively along the grain boundaries. In other investigated materials the cracks were detected along the boundaries as well as along the body of the grain.

Card 3/3 There are 5 figures and 5 references, 4 of which are Soviet and 1 German.

KISHKIN, S. T.

The first prize of 10,000 roubles(imeni D. K. Chernov) was awarded to the following team: Professor S. Z. Bokshteyn, Engineer T. I. Gudkova, Doctor of Technical Sciences Professor A. A. Zhukhovitskiy, Doctor of Technical Sciences Professor S. T. Kishkin and Engineer L. M. Moroz for the paper "Investigation of the diffusion and the distribution of components in a real metal by means of radioactive tracers". The work described in this paper represents experimental and theoretical work of fundamental importance on diffusion in alloys as a function of the structure of the metal and the stress field caused by external action. A brief summary is given of this paper and it is stated that it is not only of major theoretical importance but also of practical interest, particularly from the point of view of the problem of high temperature strength.

Results of the 1958 Competition for Obtaining imeni D. K. Chernov and imeni N. A. Minkevich Prizes, Metallovedeniye i termicheskaya obrabotka metallov, 1959, No. 6, pp 62-64

KISHKIN, S.T.

PHASE I BOOK EXPLOITATION SOV/3602

Akademiya nauk SSSR. Institut metallurgii

Issledovaniye splavov tsvetnykh metallov; sbornik 2 (Analysis of Nonferrous Metal Alloys; Collection of Articles, [No.] 2) Moscow, Izd-vo AN SSSR, 1960. 202 p. Errata slip inserted. 2,800 copies printed.

Ed.: I.A. Oding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Rzheznikov; Tech. Ed.: T.P. Polenova; Editorial Board: A.A. Bochvar, Academician; M.Ye. Drits, Candidate of Technical Sciences (Deputy Resp. Ed.); M.V. Zakharov, Professor, Doctor of Technical Sciences; E.S. Kadaner, Candidate of Technical Sciences (Resp. Secretary); A.M. Korol'kov, Doctor of Technical Sciences; N.V. Mal'tsev Professor, Doctor of Technical Sciences; and Z.A. Sviderskaya, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for workers in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

COVERAGE: This is the second volume in a series of works on nonferrous and light-metal alloys prepared by the Institut metallurgii imeni A.A. Baykova AN SSSR (Institute of Metallurgy imeni A.A. Baykov of the Academy of Sciences USSR), and the Moskovskiy institut tsvetnykh metallov i zolota imeni M.I. Kalinina (Moscow Institute of Nonferrous Metals and Gold imeni M.I. Kalinin). The problems discussed concern the casting and physical metallurgy of nonferrous alloys. The effect of alloying and deformation on the properties of various alloys, and the problems connected with the study of the casting properties and with the plotting of phase diagrams for nonferrous alloys are discussed. No personalities are mentioned. References accompany most of the articles.

69386
S/129/60/000/06/005/022
E073/E535

18.1285

AUTHORS: Bokshteyn, S.Z., Kishkin, S.T., Doctors of Technical Sciences and Osvenskiy, V.B., Engineer

TITLE: Influence of Polymorphous Transformations on Diffusion in Titanium

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, Nr 6, pp 21-26 (USSR)

ABSTRACT: The operating temperature of titanium alloys is usually 450 to 500°C which is not in accordance with the high melting point of the titanium. It can be assumed that the low heat resistance of titanium alloys is due to a certain extent to diffusion processes. According to A. D. McQuillan (Ref 5) the temperature of polymorphous transformation for pure iodide titanium is 882.5°C. At the operating temperatures the α-modification is stable, whilst at the high melting temperature the β-modification is stable. For the purpose of investigating the influence of the allotropic modification of titanium on the diffusion, the authors used iodide titanium of the following composition: 0.015% Mg, 0.01% Si, 0.02% Fe,

Card 1/4

69386

S/129/60/000/06/005/022
E073/E535

Influence of Polymorphous Transformations on Diffusion in Titanium

< 0.02% Al, <0.02% Ni, 0.008% Cr, <0.005% Mn, 0.05% C, 0.05% O, 0.025% N. Since it is known that even small quantities of admixtures exert a considerable influence on the temperature of polymorphous transformations and the properties of titanium, the authors also investigated the commercial titanium VT1D of the following composition: 0.3% Fe, 0.15% Si, 0.10% C, 0.05% W, 0.04% N, 0.15% O, 0.015% H. The commercial titanium was produced in a vacuum arc furnace with a consumable electrode with double re-smelting in a step-wise crystallizer. The electrode was made of pressed titanium sponge. The produced ingots were forged into 12 x 12 mm cross-section rods. After descaling these were vacuum annealed at 1300°C for 8.5 hours. The diffusion of lead into the titanium was studied by means of labelled atoms. The diffusion was studied in the temperature range 700 to 1100°C, measuring every 20 hours the integral intensity of the β-radiation. Table 1 gives the obtained coefficients

Card 2/4 of diffusion of lead into iodide titanium at the

69386

S/129/60/000/06/005/022
E073/E535

Influence of Polymorphous Transformations on Diffusion in Titanium

temperatures 700 to 1100°C, whilst Table 2 gives the diffusion coefficients of lead in commercial titanium at the same temperatures. Fig 2 shows the distribution of lead in titanium resulting from diffusion into commercial titanium at 850°C. The authors also investigated the influence of structural transformations during diffusion annealing on the diffusion speed using two batches, one of which was quenched from 1050°C, the other was quenched (after soaking for 100 hours) from 750°C. The respective microstructures are reproduced in Figs 3a and b. The obtained results permit elucidating the apparent contradiction between the high diffusion temperature and low heat resistance of titanium. The low temperature modification of titanium has a high diffusion mobility; the low strength of the interatomic bonds, combined with the high diffusion mobility, leads to a rapid loss of the strength with increasing temperature. However, the high temperature

Card 3/4 modification of titanium appears to possess a relatively